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OF THE INTERIOR

DRAFT SUPPLEMENT TO THE FINAL ENVIRONMENTAL STATEMENT PROPOSED SALE OF FORT MOHAVE LANDS, NEVADA

PREPARED BY

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEVADA STATE OFFICE
RENO, NEVADA

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DEPARTMENT OF THE INTERIOR

(INT FES 75-10)

DRAFT SUPPLEMENT TO THE
FINAL ENVIRONMENTAL STATEMENT
PROPOSED
SALE OF FORT MOHAVE LANDS, NEVADA

Prepared by
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEVADA STATE OFFICE, RENO, NEVADA


State Director, Nevada State Office

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SUMMARY

(X) Supplement to Sale of Fort Mohave Lands to the State of Nevada, Final Environmental Statement (Int. FES 75-10)

Department of the Interior, Bureau of Land Management

1. Type of Action: (x) Administrative () Legislative
2. Brief Description of Action: (Proposed) Transfer of the remaining 9,000 acres of National Resource Lands in Clark County, Nevada, to the State of Nevada under the Fort Mohave Act of April 22, 1960, P.L. 86-433. The land is adjacent to the Colorado River at the Southern tip of the State of Nevada, 95 miles south-east of Las Vegas, Nevada. Transfer to the Nevada Division of Colorado River Resources would take place over a period of six years after approval by the Secretary of the Interior.

This supplement was prepared in response to the National Resources Defense Council, Inc. (NRDC), and Environmental Defense Fund (EDF), comments on the final statement. (See Appendix E, p. 47.) The essential elements of the proposed action remains unchanged.

3. Summary of Environmental Impacts and Adverse Environmental Effects: Additional detailed and updated information has been provided in response to comments and concern expressed by the

NRDC & EDF. Information provided relates primarily to: (1) Existing habitat and limiting factors of possible endangered or threatened wildlife species; (2) possible presence of endangered or threatened plants; (3) flood hazard evaluation; and (4) cultural resources on the Fort Mohave Lands.

The impacts considered as adverse concern cultural resources and flood hazards.

4. Alternatives Considered: Unchanged from those considered in FES.

5. List of entities who received copy of Supplement to the final environmental statement: (See distribution list in Final Statement, p. 124B and Summary page).

6. Date Made Available to CEQ and the Public:

Draft statement: December 27, 1972

Final statement: January 23, 1975

Draft Supplement to final statement:

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DESCRIPTION OF THE PROPOSAL

In April 1975, the Bureau of Land Management (BLM) asked the Solicitor to resolve charges that the final Environmental Statement was deficient. These charges were raised in comments received from Environmental Defense Fund (EDF) on 9/16/74 and from the National Resource Defense Council, Inc. on March 13, 1975. (See Appendix E, p. 47.) By memorandum dated February 9, 1976, the Solicitor affirmed the need for additional studies to comply with:

1. Executive Order 11296, Flood Hazard
2. The Endangered Species Act
3. The National Historic Preservation Act and Executive Order 11593.

A further amendment to the Contract of Sale between the United States and the State of Nevada, entered into October 26, 1966 (Pursuant to the Act of April 22, 1960, as amended) was negotiated and signed by the Governor of the State of Nevada and the Secretary of the U.S. Department of the Interior on June 22 and 28,

1976.

Provisions within this recent amendment to the Contract provide that the Secretary of the Interior shall determine which lands are suitable for sale, and the specific conditions under which the sales will be made. Patents to the remainder of the transferable lands (which will be subject to the same conditions mentioned above) will be issued not later than six years afterward.

SUMMARY OF ACTIONS PERTAINING TO THE FORT MOHAVE LANDS.

US-CRC LAND SALES CONTRACT

June 28, 1976

Amendment to Contract of Sale
between U.S. and the State of
Nevada pursuant to the Act of
April 22, 1960 (74 Stat. 74), as
amended.

Reports

June 9, 1976

Endangered Species Act Compliance Report-Wildlife. (U.S. Bureau of Land Management.)

July 7, 1976

Endangered Species Act Compliance Report-Plants. (U.S. Bureau of Land Management.)

August , 1976

The Fort Mohave Cultural Resource Inventory, An Archaeological/ Historical Field Investigation in Southern Clark County. (Nevada Archaeological Survey, Southern Division, UNLV.)

September 7, 1976

Flood Hazard Evaluation for the Fort Mohave Lands. (Corps of Engineers, Department of the Army.)

DESCRIPTION OF THE ENVIRONMENT WITHOUT THE PROPOSAL

Vegetation

To determine the presence of Threatened or Endangered plant species in the Fort Mohave land sale area, the Bureau of Land Management conducted a literature search, herbaria search, and an onsite survey in 1976 (See Appendix A, p. 15, Endangered Species Act Compliance Report - Plants). 127 endangered or threatened plant species in Nevada (as listed in the Federal Register, Vol. 40, No. 127, dated July 1, 1975), and 21 plant species being nominated by the Northern Nevada Native Plant Society for consideration to threatened or endangered status were screened for oc-

currence within the Fort Mohave land sale area. Only Ferocactus acanthodes, a species of barrel cactus nominated by the Northern Nevada Native Plant Society, was found to occur in the land sale area. This species was not added to the proposed National rule-making list to be endangered species in Part IV of the Federal Register, June 16, 1976, due to its widespread occurrence in neighboring states. Therefore, a determination was made that no threatened or endangered plant species of National significance occur within the land sale area.

Surface Water

The flood hazard evaluation submitted by the Corps of Engineers indicates that the entire Fort Mohave lands area is subject to shallow sheet flows (See Appendix B, Flood Hazards Evaluation for the Fort Mohave lands, p. 19). Areas indicated by Zone B₁₂ as indicated by the Flood Hazards Map, p. 21 , are subject to shallow flow depths of 6 to 12 inches from the upland areas to the west caused by the 100-year-frequency flood, while zone B₆ is subject to shallow sheet flow depths of less than six inches. Peak discharges at concentration points on the land sale area are indicated on the chart in Appendix B, p. 20 . The Flood Hazards Map indicates that area within the flood plain (and within the land sale area) which would be inundated by a 100-year-frequency flood of the Colorado River, the peak flows during such an oc-

currence reaching as high as 74,000 cfs. The existing levee along the Colorado River is designed to pass 50,000 cfs, 24,000 cfs less than the 100-year flood maximum.

Wildlife

An Endangered Species Act Compliance Report for the Fort Mohave Land Sale area was completed by the Bureau of Land Management on July 9, 1976 (See Appendix C, p. 23 , Endangered Species Act Compliance Report - Wildlife). Twelve wildlife species were listed in the Final Environmental Statement on pages 49 and 77a as rare or endangered species, however, under the present classification of the Endangered Species Act of 1973, as amended, only six of these species are officially determined by the U.S. Fish and Wildlife Service to be threatened or endangered.

These species include:

southern bald eagle	-- <u>Haliaeetus Leucocephalus</u> <u>Leucocephalus</u>
peregrine falcon	-- <u>Falco peregrinus anatum and</u> <u>Falco peregrinus tundrius</u>
Yuma clapper rail	-- <u>Rallus longirostris yumanen-</u> <u>sis</u>

brown pelican	-- <u>Pelecanus occidentalis</u>
Colorado River squawfish	-- <u>Ptychocheilus lucius</u>
woundfin	-- <u>Plagopterus argentissimus</u>

Literature searches, onsite inspection, and inventory of the land sale area by the BLM study team to determine the presence and extent of (or absence of) habitat which could support any of the previously listed wildlife species concluded the following:

Habitat for the bald eagle, peregrine falcon, brown pelican, Colorado River squawfish and the woundfin does not occur on or adjacent to the Fort Mohave land sale area.

An existing 7.2 acres of possible Yuma clapper rail habitat exists within the land sale area. Present characteristics of the vegetation within this habitat area do not fulfill the habitat requirements of the Yuma clapper rail, as described in Appendix C, p. 23 . No evidence of this species presence was found during visual observation in March, 1976 or during intensive call-count survey conducted during nesting season of 1976.

Archaeology (Cultural Resources)

During 1976, the Nevada Archaeological Survey (NAS), Southern Division, conducted (under a Bureau of Land Management contract) a 50 percent cultural resource inventory of the Fort Mohave land sale area. The area was surveyed at the BLM clearance level, class 3, Intensive Inventory Survey. Cultural resources located and recorded during the conduct of the field inventory were classified through use of the following rating system.

Nevada BLM's Cultural Resources Evaluation System (CRES)

1. CRES Elements and Rating Codes. Five rating codes (S1-S4, S0) will be described. These ratings can only be assigned by a CR professional. Cultural Resources are normally only rated in the context of a Class 2 or 3 Inventory (see Information Memorandum No. NSO 76-59). A CRES rating is not static. Ratings should be periodically reviewed and changed if such action is warranted by new information.
 - a. Level S1 - NR Significance. This rating is assigned to those cultural resources which merit a high and active degree of consideration by the BLM. Meaning that the BLM will work aggressively to insure the physical preservation of S1 properties. S1 cultural

resources must be nominated to the National Register and must ultimately be listed in the National Register.

- b. Level S2 - Mid-Significance. This rating is assigned to those sites of less than NR significance, but still merit a high degree of consideration by the BLM. Properties rated as S2 are such that with minor informational changes they would be classified as S1.
- c. Level S3 - Low Significance. This rating is assigned to those properties which merit consideration by the Bureau. That consideration will mostly be of a defensive nature. Meaning that the BLM will institute measures (other than normal protection from vandalism) to actively preserve such sites, only when they are threatened by a proposed activity or undertaking.
- d. Level S4 - Date Property. This rating is only assigned to those properties which have no physical remains left in the field. Except for notation for various analytical purposes, and possibly commemoration, these properties will merit very little consideration by the BLM. This rating is mostly applied in an archaeological context; it must be remembered

that the site of a historical event can often be classified as S1 even though no physical traces of that event remain.

- e. Level S0 - Other or Not Rated - This classification is mostly applied to resources of a contemporary nature where there is not sufficient historical perspective to rate the resource. Can be used as a temporary classification for resources of an archaeological or historical nature when it is determined that there is insufficient data available for a S1-S4 assignment.

No archaeological sites or isolated finds were located in the eastern-most portion of the Fort Mohave land sale area, which is composed of the Colorado River flood plain. The alluvial fan sloping from the west toward the Colorado River, including the terraces above the flood plain of the river, contained forty (40) historic and prehistoric sites on national resource land which were inventoried and recorded. Two additional sites were located and recorded on the private land within the study area.

TABLE I
CLASSIFICATION OF CULTURAL RESOURCES WITHIN THE
FORT MOHAVE LAND SALE AREA - 1976 FIELD INVESTIGATION

<u>CRES Rating</u>	<u>Archaeological Sites</u>	<u>Historical Sites</u>
S-1	none	none
S-2	none	1 site (Private land)
S-3	17 sites (BLM)	7 sites (BLM)
S-4	16 sites (BLM) 1 site (Private Land)	none
S0	none	none

Historic sites located consisted of material that appeared to be no older than 20 to 30 years, and other structures that could be of an earlier age. The most important historic site located was a cemetery which was determined to be on private land. Pre-historic sites consisted of lithic quarry workshops, lithic scatters and concentrations, and some rock outline features. There were isolated finds of ceramics and lithics recorded and collected.

Survey techniques, results of the survey and site recommendations, and summaries and conclusions of the Fort Mohave Cultural Resource Inventory are contained in Appendix D, of this report, p. 29 . Specific site description and inventory records indicating precise site locations within the land sale area are not printed within this report. No National Register sites were encountered during the survey which met the criteria of 36CFR 800.10.

THE ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Wildlife

The possible Yuma clapper rail habitat (cattail vegetative type) on the land sale area has decreased approximately 50 percent since 1967. Successional changes are continuing to occur in the area, due to a lowering of the water table caused by levees and river (water) management priorities, with the remaining cattail areas (7.2 acres) found to be essentially dry during the period when the survey was conducted. These small cattail areas will soon be lost irrespective of, and unrelated to, the proposed action.

Archaeology (Cultural Resources)

Although no observable sites were encountered during the survey within the flood plain, there is the remote possibility of sub-surface cultural resources being found during the development under the proposed action. Development under the proposed action could disturb or destroy a number of the located sites on the alluvial fan and river terrace. Similar impacts could occur to possible existing sites within that area not inventoried.

Potential for Natural Catastrophes (Flood Hazard)

Projected 100-year overflow for the Colorado River, as shown on Flood Hazards Map, p. 21 , could cause considerable damage to proposed commercial, residential and recreational developments. The development of waterways open to the Colorado River could increase the risk of flooding and resultant damage to property and life without the protection now provided by the present levee.

Shallow flows of up to 12 inches from the upland areas to the west created by the 100-year-frequency flood could cause light flood damage throughout the Fort Mohave land sale area. (See Flood Hazards Map, p. 21 .) Flood depths and potential for damage will increase in relation to the density of buildings and paved areas constructed. Moderate to severe flood damage could occur in build-up areas during the 100-year-frequency flood.

MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION

Flood Management Plan

Development of a management plan by the Colorado River Council to provide protection from floods hazards within the flood plain and on the alluvial fan, as delineated by the Federal Insurance Administration National Flood Insurance Program, subject to approv-

al by the Secretary of the Interior. (Department of Housing and Urban Development. Elevated Residential Structures, Reducing Flood Damage Through Building Design: A Guide Manual. HUD-FIA-184. September 1976.)

Archaeological Values

Colorado River Council contract an intensive archaeological survey on the units indicated on the Proposed Recommendations map in Appendix D, p. 29, prior to development or sale of lands. C.R.C. contract for mapping, extensive photography and implementation of a controlled method for sampling for the prehistoric sites in the units indicated on the Proposed Recommendations Map p. 44, (along with any sites located during intensive inventory of the unsurveyed units) prior to sale of lands for development.

Wildlife

Develop cattail habitat areas (20 acres in size or larger) within the proposed off-river water developments to provide a likely habitat for the Yuma clapper rail.

Waterways to be developed under the proposed action could result in additional cattail sites which would fulfill the habitat requirements of the Yuma clapper rail.

ANY ADVERSE EFFECTS WHICH CANNOT BE AVOIDED
SHOULD THE PROPOSAL BE IMPLEMENTED

Archaeology

There could be a possible loss or destruction of archaeological values on sites not located by the intensive cultural resources survey.

Natural Catastrophes

The 100-year-frequency flood will cause damage to any and all developments and structures which occur within the Colorado River flood plain or the alluvial flood hazard area.

APPENDIX A

ENDANGERED SPECIES ACT COMPLIANCE

REPORT: VEGETATION

VEGETATION SURVEY - FORT MOHAVE LAND SALE ES

On June 8, 9, and 10, Messrs. Wilson, Kinsinger and Pfeiffer made numerous traverses of the Sale Area by vehicle and on foot. The Sale Area consists of one large area of approximately 9,000 acres and two small isolated tracts lying north of the large area. (See Appendix 1 for a list of major plant species encountered.) (See Appendix 2 for a series of 35mm photographs of the area.)

The main segment of the Fort Mohave Land Sale area is composed of two major land forms. Sandy and silty soils occur in the old meanders of the Colorado River up to an elevation of approximately 520 feet msl. The remaining land form, the bajada or outwash plain, rises in a northwesterly direction to approximately 1,560 feet msl in the northwest corner of Section 1, T33S, R65E.

The land adjacent to the river is interspersed with dikes and roads. The sand dune areas are dominated by bush or alkali aster with a few scattered willows. Honey mesquite, screwbean mesquite, salt cedar, brittlebush, rayless brittlebush, arrow-weed, Russian thistle, fleabane, annual buckwheats, and six weeks fescue occur in the more silty and gravelly areas. Creosotebush occurs very sparingly in this type and cattail is in almost pure stands in the pond areas.

The bajada is composed primarily of granitic derived soils with a few gravelly island remnants of an earlier surface. One major wash dissects the bajada in Sections 24 and 25, T33S, R65E, and Sections 19 and 30, T33S, R66E. Creosotebush is the dominant species, occurring in an almost pure stand at bajada base but interspersed with numerous species on the upper bajada. Other species include bursage, catclaw, cheesebush, sweetbush, white ratany, Anderson wolfberry, Cooper wolfberry, silver cholla, bladdersage, cattle spinach and rock nettle. Smoke tree and desert willow occurs only in the major wash. Beavertail cactus, barrel cactus and rigid spiny herb were found on the gravelly island remnants. Scattered galleta occurs at about 1,400 feet and above. Two decadent Mohave yuccas were observed in the northwest portion of the sale area. Herbaceous species in the area include annual buckwheats, sandmat, plantain, russian thistle, gourd, ground cherry, white-stemmed milkweed, rambling milkweed, desert croton, six weeks fescue and sand verberna.

The small isolated tract (circa 20 acres) in Section 32, T32S, R66E is composed of a desert riparian community adjacent to and east of State Highway 76 and dissected granite to the west of the highway. Tamarix and arrowweed are dominants in the desert riparian area. Creosotebush, brittlebush, rayless brittlebush, diamond cholla, silver cholla, beavertail cactus, bursage, white ratany and catclaw are the predominant species on the granite area but occur sparingly. A few honey mesquite trees were found at the entrances to side canyons. Five hedgehog cactus plants were located on north-facing canyon slopes.

Riverside and San Bernardino Counties, California; Yuma County, Arizona; northeastern Baja, California; and northwestern Sonora, Mexico, therefore, the proposed action would not threaten the barrel cactus with extinction due to its relatively widespread occurrence outside the land sale area.

It is hereby concluded that there are no endangered or threatened plant species in the Fort Mohave Land Sale area.

David G. Wilson
Plant Ecologist - Botanist

The larger isolated tract (circa 80 acres) occurs in Section 29, T32N, R32N, R66E. The desert riparian community occurs south of State Highway 76. An old sand pit, rock quarry and electricity substation dominates the southern portion of the area north of the highway. Annual buckwheats occur on this area. Species composition was similar to that found on the smaller tract.

A literature search, herbaria search, and an on-site survey was performed. The Federal Register, Vol. 40, No. 127, dated July 1, 1975 lists 127 endangered or threatened plant species in Nevada. In addition, Dr. Hugo Mozingo, Chairman, Department of Biology, University of Nevada Reno, provided a listing of 21 species being nominated by the Northern Nevada Native Plant Society.

Dr. David Wilson, Plant Ecologist-Botanist, Denver Service Center, screened the lists by a literature search of Tidestrom's Flora of Nevada, Munz's A California Flora and supplement thereto, Kearney and Peeble's Flora of Arizona, Benson's The Native Cacti of California, Bradley and Oeacon's The Biotic Communities of Southern Nevada and Holmgren and Reveal's Checklist of the Vascular Plants of the Intermountain Region.

A similar search was conducted for Federal Register species with occurrence in San Bernardino County, California and Mohave County, Arizona.

The list of possible species was reduced to 22. These were screened by herbaria searches by Dr. Wilson and Dr. Floyd Kinsinger, Denver Service Center, and Jack Pfeiffer, Las Vegas District Office at the Department of Biology and the Department of Renewable Natural Resources, University of Nevada Reno and at the Desert Research Institute, University of Nevada Las Vegas. The list of possibilities was reduced to six. Of these, the following five were not accounted for: Asteraceae - Machaeranthera ammobilia; Fabaceae - Astragalus musimonum; Scrophulariaceae - Penstemon decurvus, Penstemon nyensis, Penstemon rubicundus. These five species were subsequently deleted as possibilities when Dr. Wilson visited with Dr. Bruce MacBryde, Office of Endangered Species, Fish and Wildlife Service, Washington, D.C. From information in Dr. MacBryde's possession regarding elevation and other distribution criteria, it was determined that none of the five species occur in the land sale area.

The sixth species, Ferocactus acanthodes Britt. and Rose or Echino-cactus acanthodes Lem., is on the proposed Northern Nevada Native Plant Society additions. (This species was not added to the proposed rule-making list of approximately 1,700 native plant taxa to be Endangered Species in Part IV of the Federal Register, June 16, 1976.) This barrel cactus occurs sparingly in the land sale area. A review of pertinent Floras indicates that this species is found on rocky slopes and outwash fans, generally below 5,000 feet in San Oiego, Imperial,

Appendix 1

MAJOR SPECIES
FORT MOHAVE LAND SALE AREA

SPECIES	COMMON NAME
Typhaceae	
<u>Typha angustifolia</u>	Cattail
Gramineae	
<u>Festuca octoflora</u>	Six weeks fescue
<u>Hilaria jamesii</u>	Galleta
<u>Tridens pulchella</u>	Fluffgrass
Agavaceae	
<u>Yucca schidigera</u>	Mohave yucca
Salicaceae	
<u>Salix</u> spp.	Willow
Loranthaceae	
<u>Phoradendron californicum</u>	Mistletoe
Polygonaceae	
<u>Chorizanthe rigida</u>	Rigid spiny herb
<u>Eriogonum inflatum</u>	Desert trumpet
<u>Eriogonum pusillum</u>	Yellow turban
<u>Eriogonum thomasi</u>	Thomas buckwheat
<u>Eriogonum</u> spp	Wild buckwheats
Chenopodiaceae	
<u>Atriplex polycarpa</u>	Cattle spinach
<u>Salsola kali</u>	Russian thistle
Nyctaginaceae	
<u>Abronia villosa</u>	Hairy sand-verberna
Cruciferae	
<u>Caulanthus cooperi</u>	Cooper caulanthus
<u>Lepidium</u> spp	Mustards

SPECIES	COMMON NAME	SPECIES	COMMON NAME
Leguminosae (Fabaceae)		Labiatae	
<u>Acacia greggii</u>	Catclaw	<u>Hyptis emoryi</u>	Desert lavender
<u>Dalea spinosa</u>	Smoketree	<u>Salazaria mexicana</u>	Bladdersaga
<u>Krameria grayi</u>	White ratany	<u>Salvia columbariae</u>	Chia
<u>Prosopis glandulosa</u>			
var <u>torreyana</u>	Honey mesquite	Solanaceae	
<u>Prosopis pubescens</u>	Screwbean mesquite	<u>Lycium andersonii</u>	Anderson wildberry
		<u>Lycium cooperi</u>	Cooper wolfberry
Euphorbiaceae		<u>Physalis crassifolia</u>	Ground cherry
<u>Croton californicus</u>	Desert croton		
<u>Euphorbia polycarpa</u>	Sandmat	Bignoniaceae	
		<u>Chilopsis linearis</u>	Desert willow
Zygophyllaceae			
<u>Larrea tridentata</u>	Creosotebush	Plantaginaceae	
		<u>Plantago insularis</u>	Woolly plantain
Tamaricaceae			
<u>Tamarix chinensis</u>	Salt cedar	Cucurbitaceae	
		<u>Cucurbita palmata</u>	Gourd
Loasaceae			
<u>Eucnide urens</u>	Rock nettle	Compositae	
		<u>Ambrosia dumosa</u>	Bur sage
Cactaceae		<u>Aster carnosus</u>	Alkali aster
<u>Echinocereus englemannii</u>	Hedgehog cactus	<u>Ballea pauciradiata</u>	Lax-flower
<u>Ferocactus acanthodes</u>	Barrel cactus	<u>Bebbia juncea</u>	Sweetbush
<u>Opuntia basilaris</u>	Beavertail cactus	<u>Encelia farinosa</u>	Brittlebush
<u>Opuntia echinocarpa</u>	Silver cholla	<u>Encelia frutescens</u>	Rayless brittlebush
<u>Opuntia ramossima</u>	Diamond cactus	<u>Erigeron spp</u>	Fleabanes
		<u>Hymenoclea salsola</u>	Cheesebush
Asclepidaceae		<u>Lygodesmia exigua</u>	Egbertia
<u>Asclepias albicans</u>	White-stemmed milkweed	<u>Palafoxia linearis</u>	Spanish needle
<u>Funastrum hirtellum</u>	Rambling milkweed	<u>Peucephyllum schottii</u>	Desert fir
		<u>Pluchea sericea</u>	Arrow-weed
Polemoniaceae			
<u>Gilia spp</u>	Gilia		
Hydrophyllaceae			
<u>Phacelia crenulata</u>	Notch-leaved phacelia		
Boraginaceae			
<u>Cryptantha spp</u>	Forget-me-nots		

APPENDIX B
FLOOD HAZARD EVALUATION FOR
THE FORT MOHAVE LANDS



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90083

SPLED-WF

7 September 1976

Mr. John Trimmer
Bureau of Land Management
U. S. Department of Interior
300 Booth Street
Reno, Nevada 89502

Concentration Point	Discharge in cfs			SPF
	25 yr.	50 yr.	100 yr.	
1	750	1,200	1,800	4,300
2	950	1,500	2,200	5,300
3	550	900	1,300	3,100
4	700	1,100	1,600	3,900
5	900	1,400	2,000	4,900
6	400	650	900	2,200
7	700	1,100	1,600	3,900
8	2,000	3,200	4,600	11,000
9	900	1,400	2,100	5,000

Dear Mr. Trimmer:

Reference is made to your letter of 26 April 1976 requesting a flood hazard evaluation for the Fort Mohave lands, north of the Fort Mohave Indian Reservation.

The entire area is subject to shallow sheet flow. Inclosed is a map showing probable overflow limits, but because of the meandering of the streams flowing into the Colorado River, these limits are tentative at best. The areas indicated by the B₁₂ zone are subject to shallow flows from the 100-year-frequency flood with depths varying generally from 6 to 12 inches. Those indicated by the B₆ zone are subject to shallow sheet flow with depths generally less than 6 inches.

Also inclosed is a chart showing the concentration points with respective peak discharges for the Standard Project Flood, the 100-year, 50-year and 25-year-frequency floods.

Based on preliminary studies by this office, it is estimated that peak discharges for the Colorado River at this point are 40,000 cfs for 50-year and 25-year floods. The Standard Project Flood is estimated to be 74,000 cfs. The levee constructed along the Colorado River is designed to pass 50,000 cfs. The overflows along the Colorado River are designated as A Zone on the inclosed map.

If we can be of any further assistance, please contact Mr. Terry Wotherspoon, Flood Plain Management Section, (213) 688-5420, and refer to File No. N-01-142.

Sincerely yours,

Garth A. Fuquay
GARTH A. FUQUAY
Chief, Engineering Division



APPENDIX C

ENDANGERED SPECIES ACT COMPLIANCE

REPORT: WILDLIFE

Fort Mohave Land Sale:
Endangered Species Act Compliance Report
WILDLIFE

Filed: JUN 9 1976

Date

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I. Introduction

Under Public Law (P.L.) 86-433, approved April 22, 1960, amended April 26, 1963, 9,000 acres remain for transfer (sale) to the State of Nevada. In compliance with the Endangered Species Act of 1973 (P.L. 93-205), and as a direct result of an opinion rendered by the Department of the Interior's Associate Solicitor on February 9, 1976, it was determined that the transfer of the remaining land must be screened (analyzed and reviewed) for possible threatened or endangered species involvement. This Endangered Species Act Compliance Report is the result of that screening process.

The action remaining under P.L. 86-433, as amended, is described in an environmental impact statement (EIS) entitled "Final Environmental Statement for the Sale of Fort Mohave Lands to the State of Nevada" (FWS 75-10) filed with the Council on Environmental Quality 1/25/75. On page 77a of this EIS several wildlife species considered to be endangered and possibly to occur within the remaining 9,000 acres were noted. Only six of those species listed on page 77a are officially determined by the Fish and Wildlife Service (FWS) as threatened or endangered. These are:

bald eagle	- <u>Maliaetus leucocephalus leucocephalus</u> ;
peregrine falcon	- <u>Falco peregrinus anatum</u> and <u>Falco peregrinus tundrius</u> ;
Yuma clapper rail	- <u>Rallus longirostris yumanensis</u> ;
brown pelican	- <u>Pelecanus occidentalis</u> ;
Colorado River squawfish	- <u>Ptychocheilus lucius</u> ; and
woundfin	- <u>Plagopterus argentissimus</u> .

II. Methods

An Endangered Species Screening Team was appointed to accomplish the following:

1. Evaluate the proposed action as it relates to endangered species;
2. Search existing files and pertinent literature for information (see appendix I).

3. Consult with outside experts, as necessary, including attendance at recovery team meetings for the peregrine falcon, Yuma clapper rail, and Colorado River squawfish;

4. Conduct an onsite inspection and any needed inventories of the land sale area; and

5. File an Endangered Species Act Compliance Report, including discussion of the possible impacts of the proposed action on endangered species, if any.

This Team was established on February 27, 1976, and completed its assignment as of the date of this Report.

The Team composition and species responsibilities were as follows:

Richard R. Olendorff	- bald eagle, peregrine falcon;
Gary Ferrier	- brown pelican, Yuma clapper rail;
Osborne Casey	- woundfin, Colorado River squawfish; and
William A. Kennedy	- Team Leader.

Each of the Team members is experienced and knowledgeable of the life histories and habitat requirements of the species assigned to him (see biography or resumé of Team members in appendix II of this Report). Mr. Ferrier is a member of the Yuma Clapper Rail Recovery Team.

The onsite inspection of the land sale area was conducted during the week of March 9-13, 1976. The FWS and the Nevada Department of Fish and Game were notified of the field inventory prior to the actual inventory and will be provided copies of this Report. The primary criterion used in the field inventory was presence or absence of habitat which could support any of the listed species on a permanent basis.

Over a period of 3 days, the area was traversed both on foot and by vehicle. The entire 9,000-acre tract was either seen or traveled. The only habitat which possibly satisfied the requirements of an endangered species included several small areas of cattails. These will be discussed later in this Report in sections dealing with the Yuma clapper rail. No endangered species were observed or heard.

An intensive inventory was carried out on April 19 and 20 and May 26 and 27 for the Yuma clapper rail using the standard call-count technique. This was necessary (1) to verify existence or nonexistence of the species during the nesting season, when they can be located most easily, and (2) to determine if vegetative growth (cattails or bulrush) had begun or if, due to lowering of the water table, this habitat type is still decreasing in extent. The results of this inventory show that there were no Yuma clapper rails on the sale area during the nesting season. The inventory also confirms the Team's general conclusion that the cattail habitat is still decreasing in extent because of lack of water.

III. General Observations of the Sale Area

The general condition of the land surrounding the sale area is as follows (additional description is provided in the EIS; see appendix III for USGS quadrangle of area):

North side: An electrical generating plant is sited within 3 miles of the sale area boundary. Recreational sites, motels, gaming houses, and some private residences line the river from the sale area to Davis Dam 8 miles north. To the northwest there are low rising hills which do not extend south into the sale area.

West side: For several miles due West is a continuation of the widely spaced desert shrub association of the alluvial fan. There is no apparent endangered species habitat to the West and, therefore, it is unlikely that adverse effects could occur offsite as a result of the sale and development of the Fort Mohave lands.

South side: The Mohave Indian Reservation borders the eastern half of the south side of the sale area. The California State line is on the west half. Land forms and habitats similar to the sale area continue to the South. No endangered species habitat is known to occur within 25 miles downstream of the sale area.

East side: The Colorado River is the boundary on the east side. On the Arizona side is a private residential housing development which extends intermittently from Davis Dam to Needles, California. This private development is interrupted periodically by commercial development. Many of these developments extend to the river's edge.

Channelization of the Colorado River along the sale area has caused most of the dominant vegetation on the flood plain to appear to be dead or in a decadent condition. The Team concluded that this vegetative condition was directly related to a lowered water table as a result of channelization. As discussed later in the Yuma clapper rail section on the "Description of Existing Habitat and Limiting Factors," the small amount (less than 10 acres) of cattails found adjacent to the river in the flood plain area was in a dried condition. This is not an uncommon condition in early March, but cattails are usually associated with sufficient aboveground water. There was only a small isolated puddle of water found around the base of the cattails to ensure their long-term future existence, although sufficient recharge could occur during the spring rainy period. This did not happen in 1976 as was revealed by the intensive inventory for Yuma clapper rails in April and May.

In comparing 1954 and 1973 aerial photos (appendix IV), it is apparent that there has been a drastic change in the availability of water within the flood plain. The 1954 photos show the Colorado River to be a meandering river spread across a flood plain approximately 2 to 2 1/2 miles wide. This resulted in a slow-flowing river with substantial quantities of water-loving plants. The 1973 photos show a straight, high-velocity river which has been channelized to allow the water to be contained within a strip less than one-eighth of a mile in width. The present river channel has dikes and levees along the entire sale area. These water conditions are not conducive to emergent plants, such as the cattails, and have lowered the water elevation due to river bottom erosion and lack of soil deposits.

IV. Habitat Requirements of Possible Endangered Species

A. Bald eagle (Maliaetus leucocephalus leucocephalus)

1. **Climate:** The bald eagle is primarily a species which occupies coastal, lacustrine, and/or riparian habitats where annual rainfall is generally moderate to heavy (15 to 60 inches or more per year). The few pairs (probably less than 10) that nest in the arid southwestern United States are found in ecologically unique and instinctively traditional areas. One such area can be found along the Verde River near Phoenix, Arizona. Another, with a single pair of birds, is 25 miles south of the sale area on the Navasu National Wildlife Refuge. Arid regions support more wintering than nesting bald eagles, primarily at traditional roosts. The vast majority of the wintering bald eagles found in arid regions are the nonendangered northern subspecies (Maliaetus leucocephalus alaskanus).

2. Vegetation. Bald eagle nesting and roosting habitats are characterized by tall trees found in both extensive forests and sparse or heavy riparian forests. With few exceptions, the species is an obligate tree nester, and its preferred roosts are in trees. Nests have been found on cliffs, but this is extremely rare. Vegetational characteristics other than trees are of little importance to bald eagles.

3. Topography. Bald eagles frequently roost in trees on the steep sides of valleys, usually overlooking a stream which supports an ample food supply. In flat country, riparian or lakeside forests are necessary both for nesting and roosting. Exceptional nests on cliffs require a vertical cliff face of moderate extent, e.g. 75-200 feet in height.

4. Water. The bald eagle is associated almost exclusively with aquatic ecosystems, both summer and winter. The main diet of this species is fish and carrion washed ashore. To a lesser degree the species' diet may consist of rabbits, other small mammals, and birds, but this type of food is mostly taken opportunistically. Exceptions to the bald eagle's strict affinity for water areas may occur where road-killed rabbits and other carrion are numerous enough to satisfy its daily food requirements.

B. Peregrine falcon (*Falco peregrinus anatum* and *Falco peregrinus tundrius*). There are two subspecies of peregrine falcons which are presently listed as endangered: the American peregrine falcon (*F. p. anatum*) and the Arctic peregrine falcon (*F. p. tundrius*). The American subspecies will be considered in this Report in relation to the possibility of its nesting on or near the sale area. The Arctic subspecies will be considered only as a possible spring and fall migrant through the area; its only nesting occurs further north in Canada and Alaska.

1. Climate. Peregrine falcons can be found in different subspecific forms in both arid and nonarid environments. They also inhabit numerous climatic situations between the two extremes. Thus the American peregrine falcon nests in a variety of climates with the inland mountain ranges of the Pacific Coast States and the arid regions of the Southwest being at the extremes. Even in the arid States, however, the American peregrine falcon is most commonly associated with isolated aquatic ecosystems as described below under IV.B.3 Water. The Arctic peregrine falcon nests only in northern Canada and Alaska, but migrates through numerous climates, including the arid Southwest, to and from its wintering grounds in South America.

2. Vegetation. The 1973 and 1974 population surveys made by the Yuma Clapper Rail Recovery Team reveal that the species inhabits only the cattail and bulrush vegetative type within its distributional range in the U.S. These studies also reveal the frequency of occupation in relation to the size of the habitat areas as follows:

Size of Habitat Area	Percent Use/Occupancy
10 acres or less	Less than 20 percent
20-30 acres	57 percent
Larger than 30 acres	More than 80 percent

Smith (1974) found the highest densities of rails in relatively light cattail stands, and the lowest rail densities in dense cattail stands. Territory size averages almost 4 acres.

3. Topography. The vast majority of cattail and bulrush riparian vegetation within the distributional range of the Yuma clapper rail is located within the flood plain of the Colorado River. The species requires strips of high ground, or small islands, with gentle slopes angling upward from the water surface (Smith 1973).

4. Water. The Yuma clapper rail prefers either of two types of water surfaces: (a) water which flows through many small channels 2 to 10 feet wide, either canopied with vegetation or open; and (b) small bodies of open water 0.05 to 0.5 acres in size, either separated or interspersed with the smaller channels.

The rails prefer these types of water surfaces, together with the emergent vegetative type in a contiguous area larger than 30 acres in size. The water depth must generally be less than 1 foot, with little or no daily fluctuation.

D. Brown pelican (*Pelecanus occidentalis*)

1. Climate. The brown pelican of the Southwest prefers a relatively cool and humid climate with a mean annual temperature of about 64° F, where maximum temperatures seldom reach 100° F, and freezing temperatures are unknown. Rainfall may only be about 10 inches per year, but relative humidity averages 65 percent.

2. Topography and Geology. The peregrine falcon is curiously restricted in its breeding habitats because of its inability to construct nests. All nesting requirements with regard to substrate must be supplied by a combination of land forms and geology. For example, a sheer cliff of a thousand feet is of no value to a peregrine falcon if the geological formation of the cliff has not created ledges or cavities which can be readily used for nesting. Similarly, the most fractured cavity-filled substrate is not adequate if there are no vertical cliff faces of sufficient height. Hickey and Anderson (1969:11) described the peregrine falcon nesting requirement as follows: "Cliffs are by far the peregrine's favorite type of nesting site, and its often complete dependence on them seems to have prevented breeding of the peregrine in some regions."

3. Water. The vast majority of peregrine falcons are found in association with water where they habitually prey on aquatic birds, such as waterfowl and shore birds. This is an important though not obligate situation. Ideal topographical and geologic conditions may at times attract nesting peregrines to areas where they feed on pigeons or upland birds.

Of particular importance is the presence or absence of numerous small open water areas, such as sloughs, ponds, lakes, etc. This results in considerable movement of water birds over land in their travels from one feeding or resting area to another. Large bodies of water, such as the channelized Colorado River, are sanctuaries for ducks and shore birds. Unless a peregrine falcon can regularly pursue its prey over land, the habitat requirements for food may not be met, and the species may be restricted from the area.

C. Yuma clapper rail (*Rallus longirostris yumanensis*)

1. Climate. In the United States the Yuma clapper rail is found only in riparian habitat associated with an arid desert environment. Annual rainfall generally ranges from 3 to 10 inches, and the relative humidity averages about 25 percent. Summers are long and hot with approximately 100 days over 100° F. The winters are relatively short and mild. In the northernmost portions of its range, freezing temperatures occur an average of 65 days per year, but snow is extremely rare. The mean annual temperature is 72° F.

2. Vegetation. Low shrubs are commonly utilized for nesting, although small scattered trees may be present on some rocky nesting islands (Bent 1922). Broad sandy beaches are generally devoid of vegetation.

3. Topography. Preferred topography consists of broad sandy beaches and the endless ocean panorama. Large rocky islands with cliffs and steep slopes are required for nesting.

4. Water. Coastal ocean waters and pronounced tides, waves, currents, and wide-open spaces are preferred.

E. Colorado River squawfish (*Ptychocheilus lucius*)

1. Climate. The Colorado River squawfish can only be found where daily air temperatures are sufficiently high to maintain water temperature above 21.5° C. A minimum water temperature of 21.5° C is required for spawning and reproduction (Vanicek and Kiamer 1969). Although this minimum has been determined sufficient, it is not considered optimum.

2. Topography. Colorado River squawfish prefer meandering larger rivers, where the current is typically strong, with bottoms of mud, stones, and sand.

3. Water. This species prefers muddy water above 21.5° C for spawning.

Habitat requirements of this fish are sketchy in the literature. It does not appear to be able to adapt to rapid changes in environmental conditions and, therefore, is greatly reduced in distribution and abundance throughout its former range.

F. Woundfin (*Plagopterus argenteus*). The woundfin is presently limited in population distribution to the Virgin River below La Verkin, Utah, and one of its tributaries (Crooks 1975).

1. Climate. No specific data on climatic requirements are available. This primarily is due to climate not being as critical a component of the habitat requirements of the woundfin as are the other factors described below.

2. Topography. The woundfin can be found associated with rivers with sand bottoms and turbid water.

3. Water. The Virgin River, where the woundfin is found, has turbid water which transports large quantities of silt and clay sized particles in suspension and sand sized sediments as bedload, imparting a characteristic muddy brown color to the water. Cross (1975) collected woundfin in water temperatures varying from 10° to 35.5° C with a mean value of 23.7° C. Water velocities varied from zero to 1.13 m/sec. with a mean value of 0.42 m/sec.

Woundfin distribution, within its Virgin River environment, is determined by substrate and turbidity (considering the coloration and morphology of the woundfin). It is mostly associated with a sand bottom and a high concentration of suspended solids.

V. Existing Habitat and Limiting Factors of Possible Endangered Species.

A. Southern bald eagle

1. Climate. In the arid southwestern U.S. the bald eagle is at the extreme southern periphery of its range. The bald eagle is a water-loving species not especially suited for such harsh, dry climates. Thus climate, which is unrelated to the proposed action, is an extremely important limiting factor of the bald eagle in and adjacent to the Fort Mohave land sale. In fact, there has been no reported nesting of bald eagles in Nevada for many years, although there is a report of an active nest on the Lake Mevasu National Wildlife Refuge in Arizona 25 miles south of the sale area.

2. Vegetation. There are no large trees, such as cottonwoods, on the subject Fort Mohave lands. This one fact alone makes the area poor habitat both for nesting and wintering bald eagles. There are two small groves of trees south of the proposed sale area on the Fort Mohave Indian Reservation, but most such trees along the Colorado River between Davis Dam and the California State line are not sufficiently secluded from residential development or recreational access to provide good roosts. Of all existing habitat conditions, this absence of acceptable riparian trees is probably the most important factor that, for all practical purposes, precludes use of the area by bald eagles.

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2. Vegetation. Aerial photos from 1967 indicate the presence of approximately 14 acres of cattails on the sale area. Earlier aerial photos taken before, and immediately after, channelization show extensive backwaters, ponds, and channels throughout the sale area portion of the flood plain. The 1973 aerial photos show there are 7.2 acres of the required cattail habitat type within the land sale area. It exists in the form of five separated and isolated pockets ranging in size from about three-quarters of an acre up to slightly less than 3 acres. In view of the preferences exhibited throughout its range for habitat areas in excess of 20 acres in size, the significance of these cattail pockets to the Yuma clapper rail is nil.

The fate of these areas has already been sealed with the system of levee roads, river (water) management priorities, and resultant successional changes already occurring in the area. The April and May surveys showed these areas to be essentially dry. While other cattail areas in the region outside the sale area were a bright green, this site still had a dead and dying brown color aspect. Growing cattails were difficult to find on the sale area.

In view of these changes, it is reasonable to assume that the small remaining cattail areas will soon be lost irrespective of and unrelated to the Fort Mohave land sale.

3. Topography. The cattail areas lie within the flood plain of the Colorado River. However, they have been isolated by channelization and levee construction. They remain today as shallow depressions surrounded by unstable drifting sandy soil which is obviously encroaching rather rapidly.

4. Water. Each of the cattail areas was visually examined. Except for a spot of damp soil, or small puddle, each area was essentially dry. The nearby river channel may fluctuate as much as 7 feet daily, but this does not provide recharge of the cattail areas.

D. Brown pelican

1. Climate. The Fort Mohave sale area is located within a hot, arid desert environment. The mean annual temperature is 72° F. Approximately 100 days per year exceed 100° F, and freezing temperatures occur about 65 days. The average annual rainfall is 6 inches, and relative humidity is 25 percent. These climatic factors are not characteristic of preferred brown pelican habitat.

2. Vegetation. Dominant flood plain vegetation generally consists of salt cedar, mesquite, and arrowweed. Alluvium vegetation is primarily a widely spaced desert shrub association dominated by creosote and burro bush.

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3. Topography. Even if cliff-nesting bald eagles were common, there are no cliffs of adequate vertical extent on the sale area to attract the birds. In addition, there are no steep forested hillsides which overlook the sale area where bald eagles might roost. The flat flood plain with virtually no roosts is also unacceptable. Topographically, the sale area and surrounding terrain are not suitable bald eagle habitat.

4. Water. The Colorado River, specifically its abundant fish populations (especially carp), is the only positive ecological factor which might attract bald eagles. However, this ample supply of food is virtually unavailable to eagles because the absence of nest sites, roost trees, and hunting perches is an overriding ecological deficiency.

B. Peregrine falcon

1. Climate. The arid environment of the subject Fort Mohave lands is a limiting factor neither to nesting by the American peregrine falcon nor to use during migration by the Arctic peregrine falcon.

2. Topography. There are no cliffs on the Fort Mohave sale lands. The only significant relief occurs as abrupt but not vertical dirt and gravel banks 30-50 feet high between the flood plain and the alluvium. With regard to nesting of the American peregrine falcon, neither the topography nor the geology is satisfactory. Thus these factors are limiting.

3. Water. There is ample water in the Colorado River to attract either nesting or migrating peregrine falcons, but channelization has provided virtual sanctuary to the peregrine's prey. Small areas of open water, such as were present on the 1947 aerial photos prior to channelization, are now dried up and filled with what appears to be dead or dying cattails. Without these open water areas ducks and shore birds, the preferred prey, are confined to the river channel. Here, aerial pursuit--the peregrine falcon's preferred method of hunting--goes largely unrewarded. The prey merely dive to safety in the water ahead of a pursuing falcon.

For this reason availability of prey is a likely limiting factor on the Fort Mohave lands both with regard to nesting of American peregrine falcons and to use on migration by Arctic peregrine falcons.

C. Yuma clapper rail

1. Climate. Suitable.

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3. Topography. The Colorado River flood plain and an alluvial fan dominate the topography in the sale area. The river is contained within a manmade channel along the eastern edge of the sale area, as well as a major portion of its length below the sale. This channel is approximately 240 feet wide and is bordered by steep riprapped rock levees. Sandbars are available for resting, but they occur only temporarily and irregularly. There are no perches available for brown pelican resting or socializing. Suitable islands do not exist. Therefore, the sale area and the river topography are not representative of brown pelican habitat.

4. Water. The Colorado River does not possess water characteristics preferred by the brown pelican. The riverflow is contained within a relatively narrow channel, and mechanical control may cause rapid fluctuations in the high waterline of as much as 7 feet.

E. Colorado River squawfish

1. Climate. Suitable.

2. Topography. The building of dams, changing the Colorado River into large reservoir lakes, e.g. Mead and Mohave along the Nevada border, eliminated the Colorado River squawfish in Nevada (La Rivers 1962). Aerial photos of the river adjacent to the Fort Mohave land sale in 1947 and 1954 show considerable physical difference from the conditions which exist today. A dike was constructed during the 1960's on the Nevada side of the river which extends along the sale area. The dike is 9 miles in length extending from the California State line northward to sec. 5, T. 33 S., R. 66 E., of the Mount Diablo meridian. Along the sale area boundary there is approximately one-quarter of a mile of the river which is not contained by a dike.

Prior to the construction of the dike and dredging of the river channel, the river was braided into many small shallow meandering water courses. The river gradient, as determined from the 1970 USGS 15-minute quadrangle maps, average 1.5 feet per mile from the trisect corner -- Nevada, California, and Arizona -- upstream to the gaging station in the southwest corner of sec. 4, T. 33 S., R. 66 E., of the Mount Diablo meridian. This is a very flat gradient and explains why the flood plain was so wide before the river was altered. Under natural conditions the river was 1/4 to 1/2 mile in width throughout most of the area. The river presently varies in width from 200 to 400 feet with an average width of 240 feet.

The riverbed is composed of silt, sand, and small gravel to boulder-size rock. Much of the riverbed is sand from decomposed granite. The sand is very sterile as far as fish habitat and aquatic insects are concerned. In addition, the sand is constantly moving downstream, and the elevation of the riverbed is eroding down (a natural situation when channelization and increase in stream velocity have occurred). The constricting dikes causing higher water velocity, combined with the increased water releases from Davis Dam for power peaking, have accelerated the erosion. Side ponds, within the former flood plain, are now dry because of this lowering of the water table.

3. Water. Water releases below Davis Dam have greatly altered the habitat. The water quality has been changed, especially in regard to temperature and suspended solids. The Colorado River, along the sale and adjacent river areas, presently is clear and contains suspended solids (turbidity) only when Lake Mohave is drawn down. The frequent 7-foot daily fluctuation in water levels would also have considerable impact on certain species of fish. Water temperatures in the river have also been altered. The maximum water temperature of Davis Dam was 21.5° C with a mean temperature of 15.3° C. The river temperatures at Topock, on the Arizona side of the river approximately 10 miles below the sale area, were 22° C maximum with a mean of 16.4° C. Squawfish would not be able to spawn unless river temperatures remain above 21.1° C.

The exact date of the disappearance of the Colorado River squawfish below Davis Dam is not known. The combination of fluctuating water levels, reduced turbidity, lower water temperatures, and channelization all influenced the fish populations in the river. Introduced exotic species, such as striped bass, channel catfish, and rainbow trout, may have had some effect also. The low gradient of 1.5 feet per mile indicates that the river in this area was poor squawfish habitat even before the dams were constructed.

F. Woundfin

1. Climate. Suitable.
2. Topography. See Section V.E.2 of this Report under squawfish.
3. Water. See Section V.E.3 of this Report under squawfish.

The proposed action details plans for significant acreage of off-river water developments. If cattails are planted or become established along the shoreline of these developments, Yuma clapper rails will likely use them if and when they expand their present distributional range northward. Residential and marina developments will likely be acceptable to them as long as potential establishment of cattails is permitted. An area that supports one of the greatest densities of Yuma clapper rails, 225 miles south of the sale area, also simultaneously supports one of the most active levels of intense recreational use along the entire length of the river (powerboating, water skiing, swimming, and fishing).

Literature Reviewed (Limited to those references most applicable to the Fort Mohave area).

* Bald eagle

- Mickerson, P. R. 1974. The national bald eagle surveys -- 1973 and 1974. U.S. Fish and Wildlife Service. Unpubl. Rep. 7 pp.
- Thelander, C. G. 1973. Bald eagle reproduction in California, 1972-1973. Wildl. Mgmt. Branch Admin. Rep. No. 73-5. 17 pp.

* Peregrine falcon

- Bond, R. M. 1946. The peregrine population of western North America. Condor 48(3): 101-116.
- Fyfe, R., S. A. Temple, and T. J. Cade. In Press. The North American Peregrine Survey, 1975. Can. Field-Natur.
- Mickey, J. J. (ed.). 1969. Peregrine Falcon Populations, Their Biology and Decline. Madison: University of Wisconsin Press. 596 pp.
- Porter, R. D., and C. M. White. 1973. Peregrine Falcon in Utah, emphasizing ecology and competition with the prairie falcon. Brigham Young Univ. Sci. Bull., Biol. Ser. 18(1): 1-74.

* Yuma clapper rail

- Gould, G. I. 1975. Yuma clapper rail study - censuses and habitat distribution 1973-74. Calif. Dept. of Fish and Game. Admin. Rep. No. 75-2.
- Ohmart, R. D., and R. W. Smith. 1973. North American clapper rail (Reithus longirostris) literature survey with special consideration being given to the past and current status of yumanensis. Completion Rep. Bur. Reclamation Contract No. 14-06-300-2409.
- Smith, P. M. 1973. Yuma clapper rail study Mohave County, Arizona. Calif. Dept. of Fish and Game. Progress Rep., Job II-5.9. June 1974.

The woundfin is not present in the Colorado River below Davis Dam and could not be established by introduction because the habitat is not suitable. Water temperatures are well below the range preferred by woundfin. The clear water in the Colorado River also makes it unsuitable for woundfin. The mean water temperature of 23.7° C reported for woundfin habitat is 2.2° C higher than the maximum 21.5° C reported for the Colorado River below Davis Dam.

VI. Impacts of the Proposed Action

A. Bald eagle, peregrine falcon, and brown pelican. The proposed sale of Fort Mohave lands will not jeopardize the continued existence of the bald eagle, peregrine falcon, or brown pelican. In addition, the critical habitat issue is irrelevant with regard to these species because their presence on the Fort Mohave lands is highly unlikely or, at most, sporadic. Furthermore, because of the total lack of suitable topography, vegetation, roosting, and nesting sites, and because of the impracticability of a reversal of channelization of the Colorado River, the Fort Mohave sale lands are not likely ever to be critical habitat for the bald eagle, peregrine falcon, or the brown pelican.

B. Yuma clapper rail. Under the present conditions, as described, there is little, if any, suitable habitat remaining for this species. Furthermore, there probably will be little or no such habitat in the future, with or without the proposed action. There have been no authenticated observations of Yuma clapper rails within the Fort Mohave land sale area. The 7.2 acres of possible habitat within the area meet the habitat requirements of the rail only in that it occurs within an acceptable range of climata, and consists of a preferred vegetative type. Characteristics of the vegetation, such as its density of growth, size, location, and water component, do not fulfill the habitat requirements of the clapper rail. Mitigating measures, as described in section VII of this Report, may create new and better quality habitat and encourage Yuma clapper rail population growth and expansion. Implementation of the proposed action will in no way cause an adverse impact on the species.

C. Colorado River squawfish and woundfin. The proposed action would have no impact, either positive or negative, on any threatened or endangered fish.

VII. Mitigating Measures Under the Proposed Action

The lack of suitable habitat and the relatively low potential for developing such habitat for any species other than the Yuma clapper rail are obvious from the material presented. Therefore, the only mitigating measure offered below is for the Yuma clapper rail. It is offered even though present habitat conditions are in a declining state.

* Brown pelican

Bent, A. C. 1922. Life Histories of North American Petrels and Pelicans and Their Allies. U.S. Nat. Mus. Bull., No. 121.

Lawson, C. S. 1973. Notes on Pelecaniformes in Nevada. Western Birds 4:23-30.

McCaskey, G. 1970. The occurrences of four species of Pelecaniformes in the Southwestern United States. Calif. Birds 1(4).

* Colorado River squawfish and woundfin

Cross, J. M. 1975. Ecological distribution of the fishes of the Virgin River (Utah, Arizona, Nevada). Master Thesis. Univ. of Nevada, Las Vegas.

LaRivers, I. 1962. Fishes and Fisheries of Nevada. Carson City: Nevada State Printing Office.

Minkley, W. L. 1973. Fishes of Arizona. Phoenix: Arizona Game and Fish Dept. 293 pp.

Siglar, W. F., and R. R. Miller. 1963. Fishes of Utah. Salt Lake City: Utah State Dept. Fish and Game.

Vanicek, C. D., and R. H. Kramer. 1969. Life history of the Colorado squawfish, Ptychocheilus lucius, and the Colorado chub, Gila robusta, in the Green River in Dinosaur National Monument, 1964-1966. Trans. Amer. Fish. Soc. 98(2):193-208.

APPENDIX D

CULTURAL RESOURCES INVENTORY

THE FORT MOJAVE CULTURAL RESOURCE INVENTORY,
AN ARCHAEOLOGICAL/HISTORICAL FIELD INVESTIGATION
IN SOUTHERN CLARK COUNTY, NEVADA

August, 1976

Prepared for the Bureau of Land Management
Las Vegas District Office, Las Vegas, Nevada

P.O. #YA-510-PH6-107

Submitted by:

Nevada Archaeological Survey,
Southern Division, UNLV
Richard H. Brooks, Daniel O.
Larson and Kathryn Olson,
Archaeology; Joseph King, Ethno-
Botany; Robert Leavitt, Photography;
Kathryn Olson, Laboratory Analyst



NEVADA ARCHAEOLOGICAL SURVEY,
SOUTHERN DIVISION
UNIVERSITY OF NEVADA, LAS VEGAS
4505 MARYLAND PARKWAY • LAS VEGAS, NEVADA 89154 • (702) 739-3382

November 23, 1976

State Director
Bureau of Land Management
Nevada State Office
Federal Building
300 Booth Street
Reno, Nevada 89502

Atten.: Robert York

Dear Sir:

In accordance with Purchase Order #YA-510-PH6-107 received from the Las Vegas District Office of the Bureau of Land Management, an archaeological surface survey was conducted by the Nevada Archaeological Survey (NAS), Southern Division in the Fort Mojave area. In the course of this investigation nine historic sites were recorded, of which eight were rated as "S3" values under the Nevada BLM's CRES guidelines and one site (CR NV-05-410) was rated as an "S2" property. The historic properties merit concern, but none are of a quality to be listed in the National Register of Historic Places. Recommended mitigation measures, then, follow from these significance classifications:

1. Subject properties shall be considered for in situ preservation and if this should not be feasible:
2. Conservation of data shall be undertaken through appropriate techniques (photo records, mapping, excavation, etc.) decided upon in consultation with a historian and/or historic archaeologist prior to alteration of the property(s).

The above paragraph modifies and amends the recommendations given in the fourth paragraph, original page 75 of the Fort Mojave report and, is to

Bureau of Land Management
September 22, 1976
Nevada Archaeological Survey,
Southern Division

ERRATA SHEET

Change the CRES S2 to CRES S3 on the following pages:

p. 27 (2)*	p. 44 (1)**	p. 61 (8)	p. 70 (3)
p. 29 (2)	p. 47 (2)	p. 62 (8)	p. 72 (1)
p. 32 (2)	p. 49 (2)	p. 63 (9)	p. 76 (1)
p. 34 (2)	p. 51 (1)	p. 66 (2)	
p. 38 (2)	p. 52 (1)	p. 67 (1)	
p. 40 (2)	p. 54 (2)	p. 68 (1)	
p. 41 (2)	p. 56 (2)		

* Number in parenthesis indicates number of changes on each page.

** 26CK1413 remains S2.

November 32, 1976

2

be considered the final position of NAS in this matter.

The Nevada Archaeological Survey consulted with Dr. Ralph Roske, Professor, History Department, UNLV and John M. Townley, Director, Nevada Historic Society, in regards to the recorded historic sites.

In addition, page 72 of "The Fort Mojave Cultural Resource Inventory, An Archaeological/Historical Field Investigation in Southern Clark County, Nevada" is in error and should be deleted from the report.

If I can be of any further assistance, please contact me at 739-3382.

Sincerely,

Daniel O. Larson

Daniel O. Larson
Senior Field Archaeologist

DOL:kv



UNIVERSITY OF NEVADA, LAS VEGAS

4505 Maryland Parkway

Las Vegas, Nevada 89154

College of Arts and Letters (702) 739-3349

Department of History

November 22, 1976

Richard Brooks
Nevada Archaeological Survey
University of Nevada
Las Vegas, Nevada 89104

Dear Richard:

I have been talking with Dan Larson and looking at some of his photographs. It does seem to me that the buildings that you have been studying do have historical significance. They may have been used for two purposes: First, they undoubtedly saw some use as a shelter by parties who grazed cattle periodically in that vicinity. Second, they probably were used as a haven for rum runners i.e. bootleggers who used more lenient Nevada to run prohibition-banned spirits into Arizona. In any event they do have historical significance and should be preserved if possible.

Sincerely,

Ralph J. Roske

Ralph J. Roske
Professor of History



NEVADA HISTORICAL SOCIETY

Founded 1904

1650 NORTH VIRGINIA STREET
TELEPHONE 784-6397
RENO, NEVADA 89503

November 5, 1976

Dr. Richard Brooks, Director
Museum of Natural History
University of Nevada
Las Vegas, NV 89109

Dear Dick:

We have taken a look at the historic sites reported in your Fort Mohave Cultural Resource Inventory and have the following comments to make:

1. Concur that an historian be included in any further, more detailed study of the cultural resources of the area.
2. Concur that the findings indicate that most historic structures located were primarily associated with ranching and/or mining in the region.
3. Comparison of the project map with 19th century maps of the area showed that the road extending south from Section One, T12N, R65E, at RM 1406, to Section Seventeen, T12N, R66E, and beyond, was part of the Government Road connecting Fort Mohave and San Bernardino. If further work contemplated, it is suggested that you plan on visually checking the shoulders of the road for cultural material. It was often either lost or discarded by freighters.

Other than those few comments, I can't add to what you have found during the survey and included in the report.

I do have one other question. Would it be possible to obtain copies of your reports, or to have one of our staff spend some time in Las Vegas making notes on the historic sites included? The data would be very valuable in our historic sites inventory.

Sincerely,

John M. Townley
John M. Townley
Director

INTRODUCTION

On June 10, 1976, the Nevada Archaeological Survey (NAS), Southern Division, submitted a budget estimate in a bid for the Fort Mojave Cultural Resource Inventory project. Subsequently the bid proposal estimate of the NAS, Southern Division, was accepted by the Bureau of Land Management and a contract was established under Order Number YA-510-PH6-107. The project area to be surveyed was approximately seven square miles, consisting of about thirty quarter sections. This survey area is located in the most southeasterly portion of Clark County, Nevada, west of and in proximity to, the Colorado River.

The archaeological surface survey was conducted by staff members of the NAS, Southern Division, University of Nevada, Las Vegas (UNLV) working under the supervision of Dr. Richard H. Brooks, project director. The technical staff included Daniel O. Larson, field and technical supervisor, Joseph King, archaeologist/ethno-botanist, Kathryn Olson, laboratory analyst and field archaeologist and Robert Leavitt, archaeological photographer. The field archaeologists were Martin E. Buassard, Evan Crabtree, Robert Crabtree, Arnie Cunningham, and Dennis Jenkins.

Authority for archaeological survey in the State of Nevada has been granted to Dr. Richard H. Brooks through a Nevada State Antiquity Permit from the Nevada State Museum, and, through the Antiquities Act of 1906, by a Department of Interior Antiquity Permit, Number 76-NV-76, July 12, 1976, through July 11, 1976.

The cultural resource inventory of the Fort Mojave area was surveyed at BLM clearance level, Class 3, Intensive Inventory Survey in accordance with the Nevada BLM Information Memorandum No. NSO 76-59 (N-930.41), 4/29/76 and

was completed over a six day field period which involved over sixty man days. Laboratory research, including lithic and ceramic analyses, as well as photographic development, required an additional eight man days; report preparation amounted to nine man days.*

The project inspector, Brian W. Hatoff, Archaeologist of the BLM Las Vegas District Office, maintained continual contact before and after the field work, and held several conferences with NAS staff to insure complete understanding of the stipulations of the contract. Through B. W. Hatoff, the BLM provided an excellent set of topographic maps with overlays to insure precision in the cultural resource inventory. Frank E. Bingham, Chief, Division of Resource Management for the Las Vegas District Office of the BLM facilitated the use of BLM data for environmental back-up materials necessary to the interpretation for the inventory of the project area.

This project is a cultural resource inventory and is not designed to include intensive historical, ethnological, climatic or comparative archaeological research. Previous archaeological surveys conducted by the NAS in this area are utilized to supplement the field observations of the geology, geography and biotic communities, in addition to providing other essential data with regard to the locations of potential site areas. The BLM final Environmental Statement (1975) for the project area has also assisted in the provision of background data and maps of the locale.

ARCHAEOLOGICAL SITE DATA REVIEW

There are no known recorded National Register archaeological sites within the area specifically designated by the BLM for the Fort Mojave area under consideration in this cultural resource inventory project. A. H. Schroeder conducted a survey for the National Park Service from Davis Dam

*This does not include the four man days spent preparing and typing BLM record forms.

to the International Border (1951) and C. Tuthill (1949) reported on an archaeological survey of the lower Davis Dam area for the National Park Service through the San Diego Museum of Man. Neither of these surveys recorded specific sites along the Colorado River in the Fort Mojave area.

Other archaeological research work in this lower Colorado River region has been done by the NAS, Southern Division, for a series of government contracts and one with a private firm with inventories of various types for such projects as transmission lines, pipe lines, proposed levee construction or other alterations. The first archaeological research by the NAS in this section of the Colorado River was conducted for the Bureau of Reclamation through the National Park Service, between 1968 and 1970, and involved a survey along both banks of the river from Davis Dam to the International Border. A side project of this major research, was a pipe line survey in 1970, where the line crossed the river north of Needles on the Fort Mojave Indian Reservation, the results of which were included in the overall project reports to the National Park Service. In 1973 a preliminary survey was undertaken for the Bureau of Reclamation through the National Park Service along a proposed transmission line on the east side of the Colorado River, which extended from Boulder City, to Davis Dam and Parker, Arizona. The archaeological investigation of sites reported in the preliminary survey was completed for the Bureau of Reclamation in 1975/76. In the process of a survey of proposed development areas in the Lake Mead National Recreation Area to determine their site potential for the National Park Service, archaeological inventory was conducted in areas just north of Davis Dam along the Colorado River at Catherine Landing and in the Christmas Tree Pass area of the Newberry Mountains, in 1974. Also in 1974 the NAS, Southern Division, reported on a preliminary survey of a proposed transmission line for the Southern California

Edison Company, which extended from the Nevada/Utah border through the Eldorado Valley to the Fort Mojave Power Plant and from there about one mile north of the northwestern boundary of the Fort Mojave survey area to the California border.

In the process of conducting these various surveys in the lower Colorado River region, the personnel of the NAS, Southern Division, acquired a background on the areas where archaeological site potential could be anticipated in the lower Colorado River region, either in the flood plains, along the river terraces or on the adjacent alluvial fans. In these previous surveys or inventories, no sites were encountered by NAS staff in the sections of the Fort Mojave project as delineated in this current proposal, since none of these surveys were conducted specifically within the boundaries of this project.

LOCATION OF THE ARCHAEOLOGICAL SURVEY

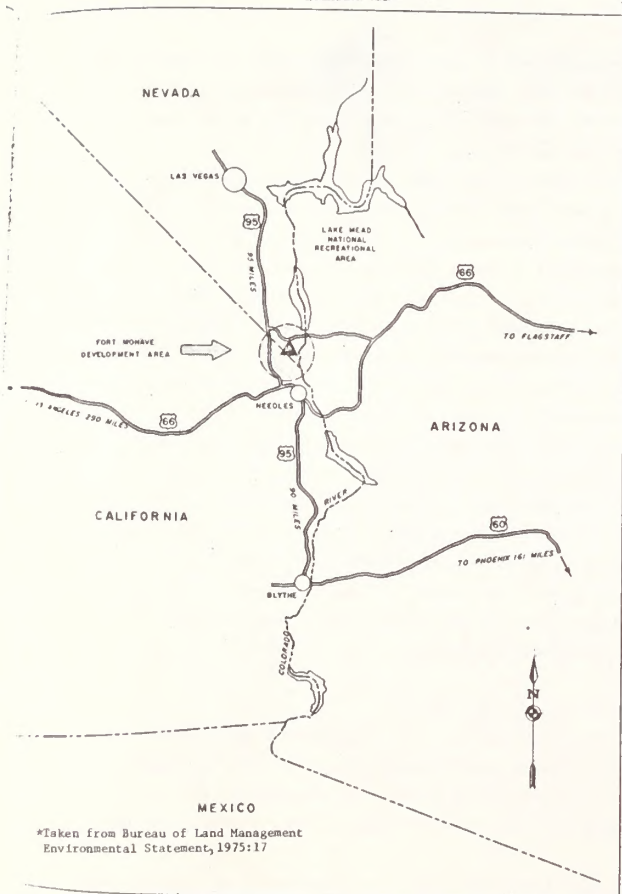
The archaeological survey was conducted in the Fort Mojave area, located in the southernmost tip of Clark County, Nevada, on the west side of the Colorado River (see Location Map). Bullhead City and Big Bend are situated on the east side of the Colorado River in Arizona, the latter city directly across from the project area. The Fort Mojave area is easily reached either from Las Vegas via U.S. Highway 95, turning east on the Davis Dam Road, Nevada State Highway 77, or from Needles via a new paved road on the west side of the Colorado River that now connects with Nevada Highway 77. This new road* from Needles to the Davis Dam Road, Highway 77, bisects the project area.

The legal description of the project area includes:

- (1) All of sections 1, 12, and 13 and fractional sections 24 and 25, township 33 south, range 65 east.
- (2) All of sections 6, 7, and 8, fractional sections 9, 10,

* Designated as the PEW road on the plastic overlays for the 7.5' series of topographic maps provided by the BLM.

LOCATION MAP*



*Taken from Bureau of Land Management Environmental Statement, 1975:17

and 15, east half, east half northwest quarter, and southwest quarter section 16, west half northeast quarter, west half, and southeast quarter fractional section 17, all of section 18, fractional sections 19, 20, 21 and 30, township 33 south, range 66 east (BLM Environmental Statement, 1975:1).

"Fractional" portions of a section mean that only a small piece of the section may not be included in the project area. These sections are located on U.S.G.S. topographic maps Mount Manchester, Nevada, California, and Arizona, 1970, 7.5 series, and Davis Dam Southeast, Arizona, Nevada, 1970, 7.5 series (see Location and Project Maps).

ENVIRONMENTAL BACKGROUND

Physical Factors. The lands under consideration in the Fort Mojave area are located in the Sonora Desert section of the Basin and Range physiographic province within the Colorado River Valley. This area is generally bounded on the north by the Newberry Mountains, on the west and southwest by the foothills of the Dead Mountains, on the south by the flood plain of the Fort Mojave Indian Reservation, and on the east by the channel of the Colorado River, which has been controlled and stabilized by the Bureau of Reclamation with a series of dikes and levees. The eastern third of the area is located on the remnant of the Colorado River flood plain that existed prior to the channelization of the river. This area is generally flat with sandy soils supporting dense, phreatophytic vegetation. West of the flood plain, the terrain rises on the alluvial fans of the Newberry and Dead Mountains. This alluvium supports a sparse, desert shrub vegetation (BLM Environmental Statement, 1975:23).

The climate of this project area is described as "typical" of the southern Great Basin arid environment. The four seasons are well defined. The summers are hot with daily temperatures commonly reaching above 100°F. The daily summer minimums, especially in the valleys range between the high 60's and low 70's. This nightly drop is created by cooler mountain air draining downward from the higher elevation, and active night radiation cooling. Winters are mild and short with average temperatures falling in the low 70's. Occasionally winter temperatures fall below freezing.

Summer precipitation generally occurs as a result of storm movement originating in the Gulf of California or the Gulf of Mexico. "The summer months bring violent thunder storms which form quickly and deliver their rain in sudden showers, causing occasional local floods and much erosion" (Longwell et al., 1965:58).

Approximately 50 percent of the annual precipitation occurs during the winter months, December through February. During the five summer months, May through September, 25 percent of the annual precipitation is received. Most of this comes during July and August from a few short-duration, high intensity convective storms (BLM Environmental Statement, 1975:23).

During the time period of the archaeological survey it was noted that the air could be quite still in the project area with a high level of humidity created by convective storms in adjacent mountain regions. The nightly drop in temperature expectable in other parts of the southern Great Basin, did not occur in the arroyos or river flood plain area, although on the upper alluvial fan slopes there was a nightly cooling accompanied by slight breezes.

The vegetation on the flood plain is typical of river bottom areas along many southwestern rivers and consists mainly of arrowweed, salt cedar, mesquite, willow, with occasional cottonwood, smoke tree, cattail, saltbush, acacia and pigmy cedar. A few annual grasses grow in the area; these are usually found where the overstory has been burned or where the water table is near the surface (BLM Environmental Statement, 1975:24).

The vegetation of the study area is a floristic blend of both the Mojave and Sonoran desert plants. Many of the flora encountered are found commonly in both regions, but occasional Sonoran plants have crossed the Colorado River and established viable populations. Of especial interest are the ocotillo (*Fouquieria splendens*) and the smoke tree (*Dalea spinosa*) that were observed to occur within the boundaries of the study area. This region is the only locale where the smoke tree occurs in the State of Nevada (Bradley, 1966). The most common specimens observed in the riverine environment and the flood

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tion along the river. The sloughs and back water area inside the river levee system provides limited habitat for ducks, waterfowl and shore birds. Several species of snakes, lizards, frogs, toads and even turtles inhabit the subject area (BLM Environmental Statement, 1975:49).

Mammals that frequent the area include shrews (family Soricidae), jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), Yuma antelope squirrel (*Ammospermophilus harrisi*), valley pocket gopher (*Thomomys bottae*), pack rat (*Neotoma lepida*), many species of mice (families Heteromyidae and Cricetidae), coyote (*Canis latrans*), desert kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and bighorn sheep (*Ovis canadensis*) (Blair, et al., 1968).

Population size of the various faunal types is related to the environmental factors. In this area faunal population sizes are greater along the Colorado River in the flood plain and in the mountains rather than on the alluvial fan slopes. It should be noted that migration is probable between both environments by several species throughout the year.

In general, the alluvial fan area with the desert shrub vegetation, provides habitat primarily for a small population of nocturnal desert wildlife, which would include small rodents, lizards, and insects. Because of the arid nature of the area, little wildlife is seen in daylight hours, with the exception of perhaps lizards. The flood plain provides more food, cover and water for wildlife habitat, thus producing a more varied population (BLM Environmental Statement, 1975:49).

Geology - The primary geological features of the area can be divided into two parts: (1) consolidated rocks; and (2) alluvium. The consolidated rocks are a complex of Precambrian igneous and metamorphic rocks consisting of gneiss, schist and granite, which form the Newberry and Dead Mountains to the north and southwest of the Fort Mohave area. Some tertiary sedimentary rocks consisting of non-marine clastics in some places interbedded with flow and pyroclastic rocks, and fresh water limestone are also formed. All unconsolidated to semi-consolidated alluvial deposits cover most of the area, including the flood plain. This alluvium probably ranges in age from Pliocene to Recent, with most of the exposed material to be of Quaternary age. The alluvial aprons of the Colorado River Valley are underlain by lenticular beds of gravel, sand, silt, clay eroded from adjacent mountains. Coarse alluvial materials are contained in numerous washes cutting the alluvial aprons.

plain were arrowweed (*Pluchea sericea*) and the introduced salt-cedar or tamarisk (*Tamarix pentandra*). The edible mesquites, honey bean (*Prosopis juliflora*) and screw bean (*Prosopis pubescens*) were noted growing in thick stands in some of the survey areas in the flood plain (Plate 1). The introduced tamarisk has already invaded the mesquite forest and is crowding these native plants (Plate 2).

"The alluvium supports a desert shrub vegetation, typical of alluvial fans in the Mohave Desert. Annual grasses and weeds appear when precipitation occurs and conditions are ideal" (BLM Environmental Statement, 1975:24) (Plate 4). The plant types common to the alluvial fans include creosote (*Larrea divaricata*), salt brush (*Arthrocnemum* spp.) (Plate 3), burro bush (*Frazeria dumosa*), cat's claw (*Acacia greggii*), Jimson weed (*Datura meteloides*), desert spiny herb (*Oxytheca* spp.) and sokeweed (*Gutierrezia sarothrae*). Other plants that were observed are the ground cherry (*Physalis crassifolia*), coyote melon (*Cucurbita foetidissima*), Mojave yucca (*Yucca schottigera*), and milkweed (*Asclepias subulata*). Various cacti located within the area include barrel cactus (*Echinocereus engelmannii*), buckthorn cholla (*Opuntia acanthocarpa*), jumping cholla (*Q. bigelovii*) and beaver tail (*Q. basilaris*). Many hardy specimens of pencil cactus (*Opuntia ramosissima*) appear to have reached an optimal height of 15 cm.

The fauna that inhabit this project area include fish, amphibians, reptiles, mammals and birds. The amphibians and reptiles consist of numerous lizards and snakes and other poikilotherms. The bird species found inhabit the area on both a year round and seasonal basis and it is a major migration stop for numerous species.

Birds and waterfowl may be found primarily in the phreatophytic vegetation of the flood plain. Quail, hawks, vultures, mourning dove, owls, and numerous water birds and shore birds utilize the dense vegeta-

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Older alluvial terrace deposits, scattered lake deposits, and dissected alluvial fan deposits occur in the Colorado River Valley (BLM Environmental Statement, 1975:29 taken from Rush and Huxel, 1966, which conforms with Longwell et al., 1965).

It was noted during the survey that there is a high incidence of granitic float materials in the upper alluvial fans; in the higher section of the apron, there were a number of low outcroppings of granite boulders. These boulders were thought to be potential site areas, but they proved to be negative archaeologically within the survey sections. The coarse alluvial gravels mentioned in the geological quote from the BLM Environmental Statement include also well-rounded river cobbles that are incorporated in a number of the ancient river terraces identified on the western side of the Colorado River.

The Newberry Mountains, the Dead Mountains and their extensive alluvial fans dominate the landscape geologically in this region. The other major geological feature is the Colorado River basin, itself (Overview Plates 3 and 4). In the alluvial fan area sheetwash seems to be the predominant erosional factor, although on the western edge of the project area, close to the San Bernardino County line, California-Nevada border, there is a well-developed major wash in Sections 19 and 24 (Plate 23). Intensive survey was conducted along the edges and the banks above this major arroyo because of its site potential.

Soils - The soils of the Fort Mohave area occupy two principal land forms: (1) river flood plain; and (2) alluvial fans. Soils on the nearly level flood plain are stratified, fine loamy sediments, for the most part superimposed in a few places by sand dunes. Joining the flood plain to the west are strongly sloping alluvial fans. The modern drainage system is deeply entrenched in these fans and tends to widen and form deltaic depositional areas where they join the flood plain. In general, the soils are coarse grained, derived mostly from granitic rocks. Depth to restrictive material and slope varies according to position on the fan (BLM Environmental Statement, 1975: 24-25).



PLATE 1



PLATE 2



PLATE 3



PLATE 4



PLATE 5

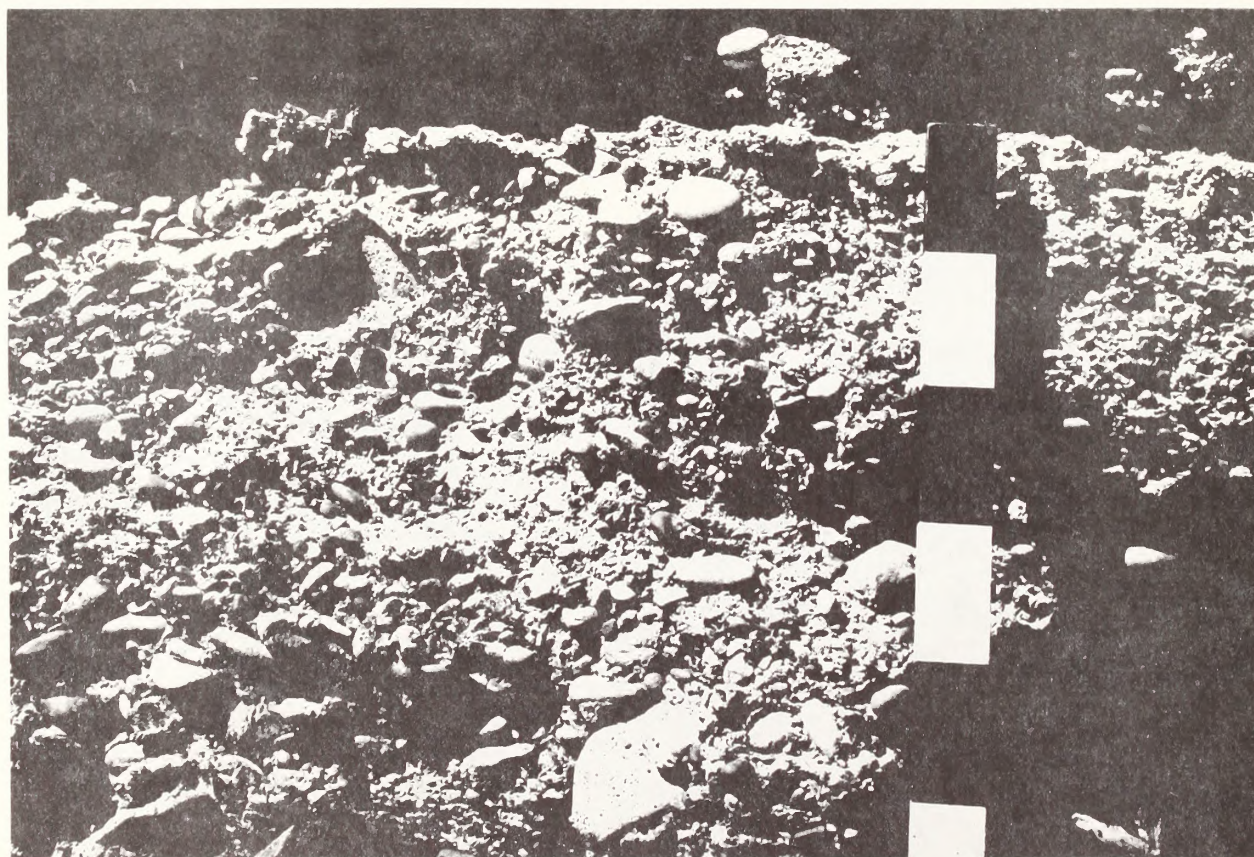
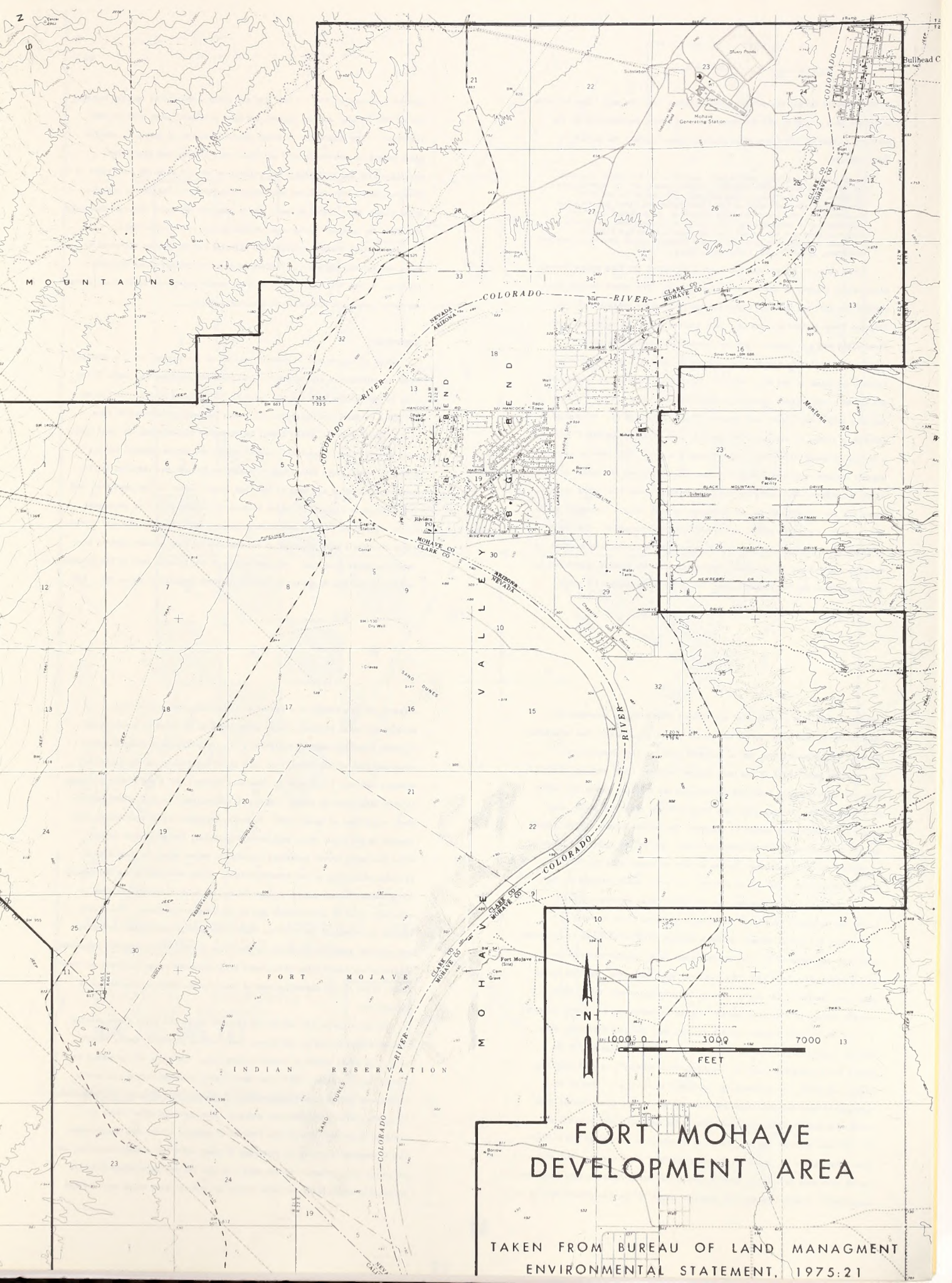


PLATE 6 36



FORT MOHAVE DEVELOPMENT AREA

TAKEN FROM BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL STATEMENT, 1975:21

It was observed during the current survey project that the sand dunes are more extensive than stated in the BLM report, quoted above, particularly in the northern section of the flood plain where it abuts against the second river terrace.

Topography - Topography can best be described as two major features: (1) the flood plain below the 510' contour line; and (2) the alluvial fan above 510' elevation....The alluvial fan starts at the 510' elevation at the west edge of the flood plain and rises in elevation westward up to the lower alluvial slopes of the Newberry and Dead Mountains, to a maximum height of 1,560' in the extreme northwest corner....Numerous dry washes and channels dissect the alluvial materials on their way eastward to the Colorado River (BLM Environmental Statement, 1975:29) (See Topographic Map).

River terraces are another topographic aspect of the Fort Mojave terrain which relate closely to the archaeological survey. The lowest terrace lies between the 490' and the 510' elevation and is in close proximity to the Colorado River (Overview Plate 1). This terrace marks the beginning of the flood plain where it extends from the lowest river terrace to the 510' contour line where the second river terrace is located. The second river terrace continues to the 600' contour. The terrain between the lowest and the second river terrace consists of fine alluvial sands and loamy silts and is a relatively recent soil deposit (Plates 1 through 4). The second terrace is formed of cemented river gravels with surface substrates comprising a desert pavement (Plates 5, 6 and Overview Plate 1). This terrace is being rapidly covered by alluvial wash from the higher fans and is heavily dissected along its eastern edge bordering the flood plain. Above the second terrace there are two ill-defined and one prominent ancient terrace formations which are remnants, partially buried in the alluvial fan overburden. The highest of these upper ancient terrace remnants appears as a distinctive landmark in Overview Plate 2 and all of these terrace remnants are readily identified in the topographic and the project maps. Approximate elevations for these

cemetery within this private land was visited (Plate 19) to determine its exact location, and later during the survey proper the cemetery was officially recorded as a historic site and is included with the site descriptions. This private land, where it had been cleared recently for a proposed trailer park, was an outstanding landscape feature and was utilized during the survey as a check point. The gas pipe line road, crossing the flood plain, also served as a distinctive marker to delineate the border between the BLM Lands and the Fort Mojave Indian Reservation Lands. One factor aiding the location of section or quarter-section corners already mentioned were the several mineral exploratory roads in the alluvial fan area, which extended to the edge of the second river terrace. By following these exploratory roads access was available to most of the quarter sections to be surveyed.

During the actual survey a Brunton compass could be utilized to determine east-west and north-south orientation between known quarter-sections as the alluvial plain is a wide and relatively open landscape. Mileage checks were used throughout the survey project in combination with the Brunton compass sitings to determine quarter section distances and to assure accuracy.

In the contract between the BLM and the NAS, Southern Division, under Special Conditions, #2, the project area was to be investigated "at the Nevada BLM's clearance level #2 (Reconnaissance Survey)", in that only two quarter sections, the northwest and southeast one-quarters, were to be surveyed in each section within the Fort Mojave project area. Within each selected quarter section the survey was to be conducted (see item #14 in the BLM contract with the NAS, Southern Division) at the Nevada BLM's clearance level, Class #3, Intensive Inventory Survey. This requires that the survey crew walk parallel transects close to 10 meters apart, where possible. Specifically item #14 of the BLM contract stated "If an area cannot be

ancient terraces are 540' to 580' for the lowest, the middle terrace remnants are at 600' to 680' and the highest and most prominent is at 800' to 880' elevation. The substrates on these terraces consist of gravel to cobble-sized materials composed mainly of crypto-crystallines and quartzites, heavily rolled and patinated. The surface is covered with the same types of materials which were utilized aboriginally as quarries for lithic workshop areas (Plate 30). These ancient terrace remnants represent the most important potential for archaeological site locales within this project area.

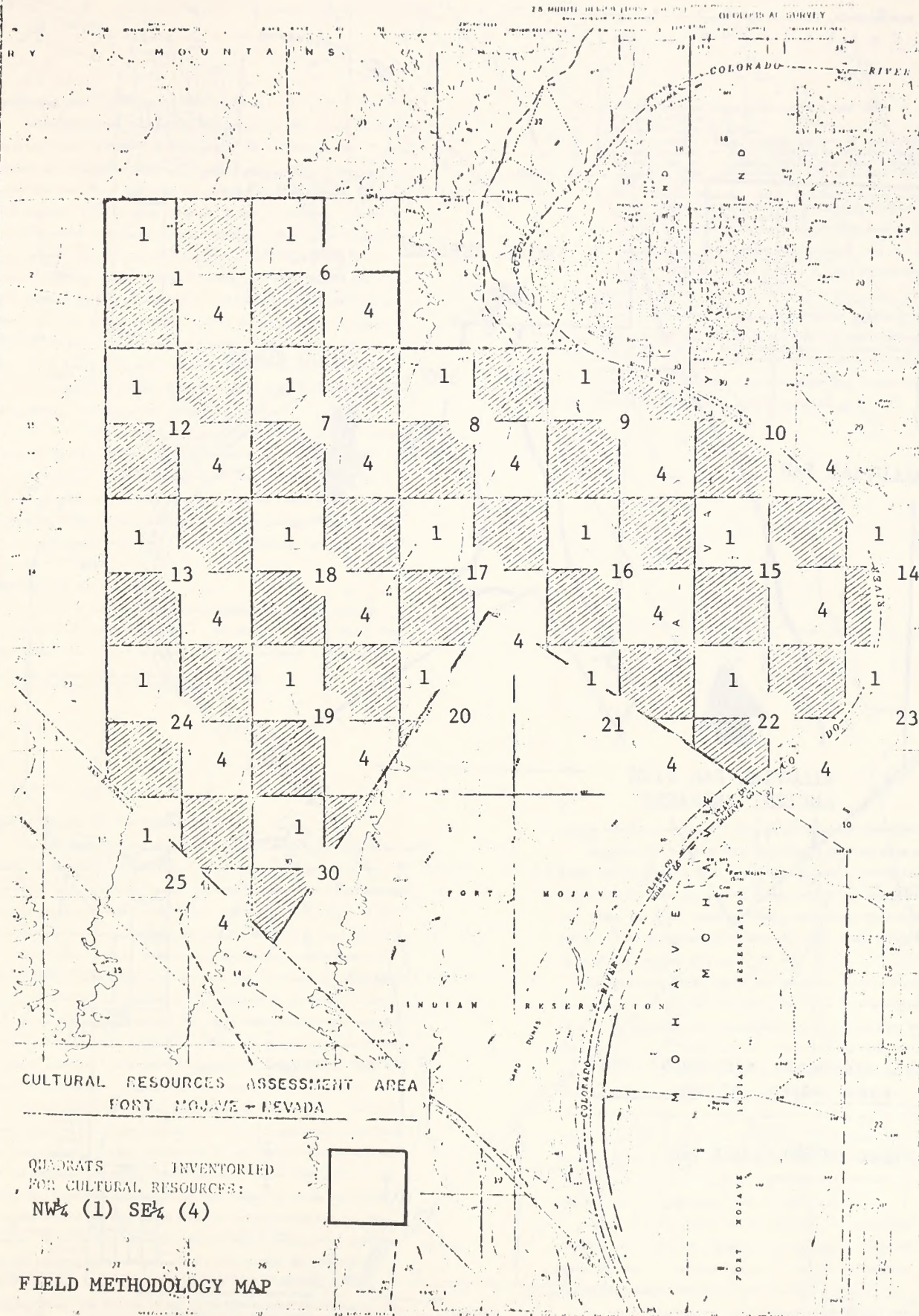
Above these ancient terraces the alluvial fan is heavily dissected by sheet erosion and contains no further evidence of exposed river terraces (Overview Plates 3 and 4). There were no cobble substrates on the fan, where the major components consisted of granitic gravels.

METHODOLOGY

Prior to the intensive inventory survey of the project area, a preliminary reconnaissance was conducted, utilizing the previous knowledge of the area in combination with the new U.S.G.S. 7.5' advance sheets, provided by the BLM. In this reconnaissance all roads, including transmission line roads, gas line roads, paved roads, levee roads, mining roads and jeep trails were investigated to determine ease of access and survey control for the project. These roads were found to border section lines, transect section corners or midlines and many of them had direct access to the new paved road from Needles to Highway 77, which bisects the project area. In particular it was determined in this preliminary investigation that the test-pit mining roads frequently were situated on section lines. Some section markers also were located at this time. The perimeters of the private land in the NW corner of Section 16 and the NE corner of Section 17 were identified (Plate 20). The

surveyed in this manner as a result of logistical limitations (e.g. excessively steep terrain), those areas shall be so noted on a map in the cultural resources report" (1976:#14). In the preliminary reconnaissance those portions of the flood plain with dense vegetation, as the tamarisk, mesquite and salt brush growths (Overview Plates 1 and 2 and Plates 1 through 4) were identified as having logistical limitations, so that survey methodology would have to be altered. In those quadrants (field methodology map) located in the flood plain with dense vegetation, the areas were walked where the dense growth permitted passage, or where animal or jeep trails provided visibility of the ground surface. Close observation was maintained along washes, around animal burrows (where evidence of subsurface site materials could be encountered) and in the eroded sand dunes. The ground surface is currently covered with wind-blown sand in the dunes, or fluvial and alluvial deposits elsewhere in the flood plain. These recently deposited materials may have buried prehistoric sites situated along the previous river banks, prior to the channelization of the Colorado River by the Bureau of Reclamation.

On the alluvial fan and on the terraces above the flood plain parallel transects were walked by the survey crew, spaced 10 meters apart, except in the few sheet washes or deeper arroyo cuts. The banks of the washes or arroyos and the ridges above them were closely examined during the survey, although in the wash beds, themselves, the survey was expanded to approximately 30 meters distance between crew members. When archaeological sites or isolated finds were encountered concentric circles around each locale were walked between transects to determine if there were additional materials, and to locate the perimeters of the site. In the few instances where granitic boulders or small hills occurred within the survey area, these were checked



for shelter sites and/or rock art manifestations.

Survey sample unit designations were determined prior to the field work in a consultation between B. W. Hatoff, BLM, and D. O. Larson, NAS. Section numbers were utilized as sample unit numbers and these were broken down into their four quarters or quadrants; the northwest quadrant being 1, the northeast quadrant, 2, the southwest quadrant, 3, and the southeast quadrant, 4. For each section in the project area, following the BLM contract requirements, two quadrants were surveyed, the northwest (1) and the southeast (4). On the field methodology map these are indicated as "12-1", "12-4", etc. The site discussions, descriptions, results and recommendations begin with survey sample unit 10-4 in the northeast corner of the project area, proceeding south to the project area's southern boundary. Then the next series of sections is considered from the northern border to the southern boundary and this procedure is followed moving through to the west side of the project area boundary where the survey terminated.

All sites were evaluated by the BLM Cultural Resource Evaluation System (CRES) in the field to determine their cultural significance. Surface collecting of sites followed the method delineated in items #9 and #10 of the BLM contract with the NAS. No test-pitting was deemed necessary and collecting on sites of surface materials was only conducted on those sites that were designated as "small" sites or where isolated finds were encountered.

ARCHAEOLOGICAL SITE DESCRIPTION

In order to quantify the site data generated by this project, the following format has been organized for the purpose of archaeological site discussion; this material is presented for easy retrieval also in Table 1:

1. Permanent BLM Site Number (CR-NV-05-389)
2. Permanent NSM Site Number (26CK1407)

RESULTS OF SURVEY AND SITE RECOMMENDATIONS

The Fort Mojave project terrain was basically divided into two physiographic areas, the Colorado River flood plain, which contained dense growths of vegetation, and the alluvial fan sloping from the Newberry and Dead Mountains towards the Colorado River valley, with a sparse vegetation cover. In the flood plain area, which composed approximately one-third of the survey area, no archaeological sites or isolated finds were located. These negative data probably relate to the heavy brush and tree cover and the depositional overburden characteristic of the sections adjacent to the Colorado River. Even in the dune areas within the flood plain, which generally are considered potential archaeological site locales, there was a complete absence of archaeological materials. Survey units included in the flood plain are 16-1, 16-4, parts of 21-1 and 21-4, 22-1 22-4 and part of 9-4 (Topographic map).*

On the second river terrace above the flood plain a number of historic and prehistoric sites were recorded. It is probable that the historic sites are the results of the BLM leasing land to small ranchers for cattle-grazing in the adjacent flood plain. During the survey in the flood plain, it was noted that there were a number of old fence lines, cut boards related to probable corrals, numerous cattle trails and other evidence of this type of usage. On the second terrace the historic sites consisted of an existing corral, possible corral remnants, square rock outlines that may relate to tent structures, with evidence of glass and nails in the vicinity, and historic dumps over the edge of the second terrace onto the flood plain below. In addition to the ranchers leasing land from the BLM, there may also have been squatters living on the terrace above the flood plain.

The majority of historic sites occurred in survey units 9-1 and 9-4. The historic sites, including the cemetery, found on the private land are

*These units were also included: 15-1, 15-4, 10-4, 14-1 and 23-1.

3. Nevada BLM "Cultural Resource Evaluation System" (S1)
4. Survey Unit Number (75-16)
5. Elevation from mean sea level
6. Location: township, range, section, quarters of quarter sections
7. Site Type, including any of the following or combinations:
 - A. Lithic - Any site containing lithic artifactual materials, including lithic concentrations as well as large to small scatter areas.
 - B. Lithic Quarry Workshops - Sites where rock cobbles and/or crypto-crystalline materials were quarried and prepared in the process of artifact manufacture.
 - C. Ceramic - A site at which one or more pottery sherds were found.
 - D. Historic - Any site at which historic debris such as tin cans, crockery and house foundations are found.
 - E. Isolate - Usually a single artifact or small concentration with no association to a site area.
8. Area of Occupation: extent of surface coverage.
9. Map Number: project map.
10. Plates: plate number in regard to photographs utilized in the report.
11. Situation: includes geographic situation and site location.
12. Description: includes metric measurements and direction orientation.
13. Deposition: includes an estimation or speculation of possible subsurface materials.
14. Artifacts: includes any cultural materials that were recorded in association with the site.
15. Remarks: includes present physical situation of the site.

located adjacent to survey unit 16-1, in the northwest quadrant of Section 16.

In survey unit 9-1 there were five historic sites and three prehistoric sites, all of which are rated by the Cultural Resource Evaluation System (CRES) as S-2. There were also three isolated finds of prehistoric material, both ceramic and lithic, which are rated as CRES, S-4. These sites from survey unit 9-1 are designated by BLM numbers 388 through 399 and are listed for easy data retrieval in Table 1.

For the historic sites the NAS recommends that either a historian or a historical archaeologist be consulted to determine the significance of these sites in the interpretation of the history of this southeastern portion of Clark County, Nevada. The prehistoric lithic workshop sites recorded in survey unit 9-1 will need to be photographed extensively, mapped and also need the implementation of a controlled method for sampling the frequency of occurrence of types of geological materials as well as the archaeological percussion techniques utilized. Site 26 CK 1405 contained rock outline features and it is recommended that it be mapped, photographed in detail and possibly have subsurface excavation. No recommendations are proposed for the three isolated prehistoric finds in these survey units.

In survey unit 9-4 there were two historic and four prehistoric sites which are rated CRES, S-2. The four isolated finds of lithic materials are rated CRES, S-4. These sites from survey unit 9-4 are designated by BLM numbers 400 through 409 and are listed in Table 1.

For the historic sites the NAS recommends that either a historian or a historical archaeologist be consulted to determine the significance of these sites and their relationship to the history of this portion of southern Nevada. The prehistoric lithic workshop sites recorded in survey unit 9-4 will need to be photographed extensively, mapped and have implemented a

comparable sampling method as that proposed in the recommendation for the survey unit 9-1 prehistoric sites. No recommendations are proposed for the four prehistoric isolated finds in these survey units.

In that portion of survey unit 16-1 located on the second river terrace there was one prehistoric site rated as CRES, S-2, and an isolated find of ceramic and lithic material rated as CRES, S-4. Adjacent to survey unit 16-1, on private land, is the historic cemetery, Site 26 CK 1413, which has been rated as CRES, S-2, and will need protection should this land be acquired or disturbed in the proposed development of the Fort Mojave area. These sites from survey unit 16-1 are designated by BLM numbers 410 through 412 and are listed in Table 1. Prehistoric site 26 CK 1412 contained rock outline features in association with lithic materials and it is recommended that it be mapped, photographed in detail and possibly have subsurface excavation.

The small parts of survey units 21-1 and 21-4 situated on the second river terrace contained no historic or prehistoric materials.

Above the second river terrace is the wide sloping alluvial fan which includes the exposed ancient Colorado River terrace remnants. As described previously these exposed terrace remnants are covered with quartzite and other crypto-crystalline cobbles. No historic sites were encountered in this upper alluvial fan area. With the exception of the terrace remnants, where prehistoric sites were located, the bulk of the alluvial fan is covered by granitic debris distributed through sheet wash, consisting of fine sands and small granitic gravels.

The prehistoric sites found on the alluvial fan area were situated on the ancient river terrace remnants. These sites were recorded in survey units 8-1, two lithic quarry workshop areas with associated fragments of a ceramic olla (BLM numbers 413 and 414), survey unit 17-1, one lithic quarry

workshop (BLM number 415), survey unit 17-4, one lithic quarry workshop (BLM number 416), survey unit 7-4, one lithic quarry workshop (BLM number 419), survey unit 18-1, one lithic quarry workshop (BLM number 420), survey unit 18-4, one lithic quarry workshop (BLM number 421), survey unit 19-4, one lithic quarry workshop (BLM number 422), and survey unit 30-1, one lithic quarry workshop (BLM number 423). All of these sites were rated S-2 by the CRES rating system.

Prehistoric isolated finds on the alluvial fan area were located in survey unit 6-1, an isolated ceramic (BLM number 417), survey unit 7-4, an isolated lithic (BLM number 418), survey unit 1-4, an isolated ceramic (BLM number 425), survey unit 12-1, an isolated ceramic and lithic (BLM number 426), survey unit 12-4, an isolated ceramic and lithic (BLM number 427), survey unit 13-4, an isolated ceramic and lithic (BLM number 428) and survey unit 24-1, an isolated lithic (BLM number 429). One horseshoe was found in survey unit 1-1, an isolated historic find (BLM number 424). These sites are listed in Table 1.

It is recommended that the nine prehistoric lithic quarry workshops recorded in survey units 8-1, 17-1, 17-4, 7-4, 18-1, 18-4, 19-4 and 30-1 will need to be photographed extensively, mapped and have implemented a comparable sampling method as that proposed in the recommendation for the survey unit 9-1 prehistoric sites. No recommendations are proposed for the seven prehistoric and one historic isolated finds located in survey units 6-1, 7-4, 1-1, 1-4, 12-1, 12-4, 13-4 and 24-1. These sites recorded on the alluvial fan slopes are listed in Table 1.

No prehistoric or historic sites or isolated finds were encountered on the alluvial fan in survey units 8-4, 20-1, 6-4, 7-1, 19-1, 13-1, 24-4, 25-1 and 25-4.

SUMMARY AND CONCLUSIONS

This survey project has followed the two basic physiographic features of this region: 1) the flood plain of the Colorado River; and 2) the alluvial fan sloping westward towards the Newberry and Dead Mountains. In the flood plain no prehistoric material was encountered in the surveyed quadrants and historic material consisted of a few broken and cut boards and sections of abandoned fence lines. The flood plain contains dense growths of a variety of plant types and a heavy depositional overburden of riverine and some alluvial materials. One of the reasons for the dense growth in the flood plain is the introduction of salt cedar or tamarisk, which is crowding out the native vegetation. The construction of the dikes and levees along the river, created during the channelization of the Colorado River, would have contributed to the loss of any prehistoric sites which may have existed in the immediate vicinity of the river.

The second river terrace, which is the lowest extension of the alluvial fan just above the flood plain, contained all the historic sites located during the survey. These consisted of some historic material that appeared to be no older than 20 to 30 years, and other structures that could be earlier. The most important historic site is the cemetery, a site CRES rated as S-2 in this survey. It was included in the survey at the request of the BLM Las Vegas District Office that it be located and identified as to whether it was on private land or public domain. It was determined to be on private land.

The prehistoric sites on the second terrace consist of lithic quarry workshops, lithic scatters and concentrations and some rock outline features. There were isolated finds both of ceramics and lithics recorded in these survey quadrants. The isolated finds were collected and CRES rated as S-4.

The ceramic and lithic material collected during this survey has been catalogued and the catalogue sheets are appended to this report. In the process of cataloguing these materials they have been quantified, analyzed and summarized. Procedures utilized in this analysis are similar to those found in the BLM, Granite Reef Report (1976).

Fifty-nine sherds of pottery were recovered during this survey. Fifty-two of these sherds are of Lower Colorado Buffware. Eleven sherds exhibited a stucco finish, characteristic of this ware. Lower Colorado Buffware was made by Yuman groups along the Lower Colorado River and Schroeder (1951) dates it at pre-900 A.D. to post-1900 A.D. Seven of the sherds recovered are of Tizon Brown Ware. This ware is attributed to the Upland Arizona Yuman Indians by Dobyns and Euler (1958). They date Tizon Brown Ware at about 700 A.D. to 1890 A.D.

Lithic materials collected during the Fort Mojave survey are characteristic of a percussion flake and tool technology. Lithic material consists mainly of large percussion flakes recovered from cobbles, randomly flaked cobbles and cobbles exhibiting minimal unifacial and bifacial flaking along edges formed by percussion. Microscopic utilization evidence, when present, was of battering. Quarry material consists of several varieties of quartz including chert, chalcedony and quartzite. A few objects were made from porphyritic igneous material.

Only two quadrants out of each section in the project area were surveyed, following the contract specifications, but this has demonstrated the locales where site potential and concentrations occur. In the flood plain no observable sites were encountered during the survey, but there is the possibility of subsurface historic or prehistoric materials being found during bulldozing or vegetation clearing in the developments proposed for

The historic sites have tentatively been rated S-2 with the recommendation that a historical archaeologist examine them for final determination of their possible significance. The prehistoric sites have all been rated S-2 following Nevada BLM Instruction Memorandum No. NSO 76-120. These appear to be surface sites, based on the examination of erroyo cuts through the second terrace and their situation on desert pavement. Only a few features were recorded on each of these sites and they are not unique as this type of site has frequently been encountered in previous surveys conducted by the NAS in the lower Colorado River region.

On the upper alluvial fan no historic sites were found and only one historic isolate. Scattered evidences of recent cans, telephone wire, and cartridge cells were found over a widespread area and are related to army field maneuvers within the last 10 to 20 years. Prehistoric sites, for the most part, were confined to the ancient exposed Colorado River terrace remnants. The substrates of these terrace remnants were utilized as quarry workshop areas. Most of the artifact materials found in these workshops were made with minimal preparation, involving a type of percussion manufacture. No diagnostic artifacts were encountered among lithics of these quarry workshops. There is no indication that the quarry workshops have any great time depth or can be related to the creation of the river terraces from which these ancient remnants were derived. Ceramics were found at two of the workshop areas on the terrace remnants and other sherd ware was found as isolates in the upper alluvial fan area.

The prehistoric sites on the alluvial fan were rated S-2 following the Nevada BLM Instruction Memorandum No. NSO 76-120, on the same basis as those on the second terrace. All the isolated finds, including the single historic horseshoe, were collected and CRES rated as S-4.

To locate possible pictographs or petroglyphs and shelters adjacent to boulder outcrops, and other possible lithic quarry workshops situated on ancient river terraces, the Nevada Archaeological Survey recommends that a limited Class 2 Reconnaissance Inventory Survey (spot check) be conducted in the following unsurveyed units situated on the alluvial fan (coded ☐ on the Proposed Recommendations Map):

1-2 and 3, 12-2 and 3, 13-2 and 3, 24-2 and 3, and 25-2.

To locate other possible prehistoric sites situated on the alluvial fan in the unsurveyed units adjacent to the recorded extensive lithic quarry workshop, the Nevada Archaeological Survey recommends a Level 3 (Intensive) Survey be conducted in the following units (coded ☐ on Proposed Recommendations Map):

9-3, 16-3, 8-2 and 3, 17-2 and 3, 20-3, 7-2 and 3, 18-2 and 3, 19-2 and 3 and 30-2 and 3.

The Nevada Archaeological Survey recommends mitigation measures including mapping, extensive photography and the implementation of a controlled method for sampling for the prehistoric sites situated in the following survey units (coded ☐ on the Proposed Recommendations Map):

9-1, sites 388, 391 and 392; 9-4, sites 400, 402, 403 and 404; 16-1, site 411; 8-1, sites 413 and 414; 17-1, site 415; 17-4, 416; 7-4, site 419; 18-1, site 420; 18-4, site 421; 19-4, site 422; 30-1, site 423.

The Nevada Archaeological Survey recommends mitigation measures including consultation with a historian and/or historic archaeologist for historic sites situated in the following survey units (coded ☐ on Proposed Recommendations Map):

9-1, sites 389, 390, 393, 394 and 395; 9-4, sites 401, 405 and 410; 16-1, site 412.

Without the recommended mitigation for the sites already recorded and historic and prehistoric surveys of the adjacent northeast and southwest quadrants of the second terrace and alluvial fan, no recommendation for clearance can be made to allow for the developments proposed in this area in the BLM Environmental Statement, 1975. The recommended mitigation will involve mapping, photography, and the development of a sampling technique to determine the function of the sites and the artifact assemblages

this area in the BLM Environmental Statement, 1975. For those quadrants not surveyed during this project in the flood plain, it is recommended that archaeological clearance be given on the basis of the alternate quadrants that were surveyed where no material was encountered. For those quadrants in the flood plain that have been surveyed, it is recommended that archaeological clearance be given.

The survey on the second terrace, and on the ancient terrace remnants of the alluvial fan, has demonstrated a high potential for some type of archaeological materials in association with these geographical features. A survey at a clearance level of Class 3 (according to Nevada BLM Memo. #76-59) is recommended for those alternate quadrants, with a specific design included to locate other possible terrace remnants on the alluvial fan.

No controlled surface or extensive field examinations have been conducted by archaeologists working on the west side of the Colorado River from which relevant data can be ascertained. Consequently, it is difficult to assess the significance of the Fort Mojave archaeological sites based on the criteria set forth in 36CFR800.10.

The following list represents a summation of the recommendations proposed by the Nevada Archaeological Survey for the Fort Mojave Project:

Archaeological clearance is recommended for the following surveyed units and the area coded ☒ on the Proposed Recommendations Map:

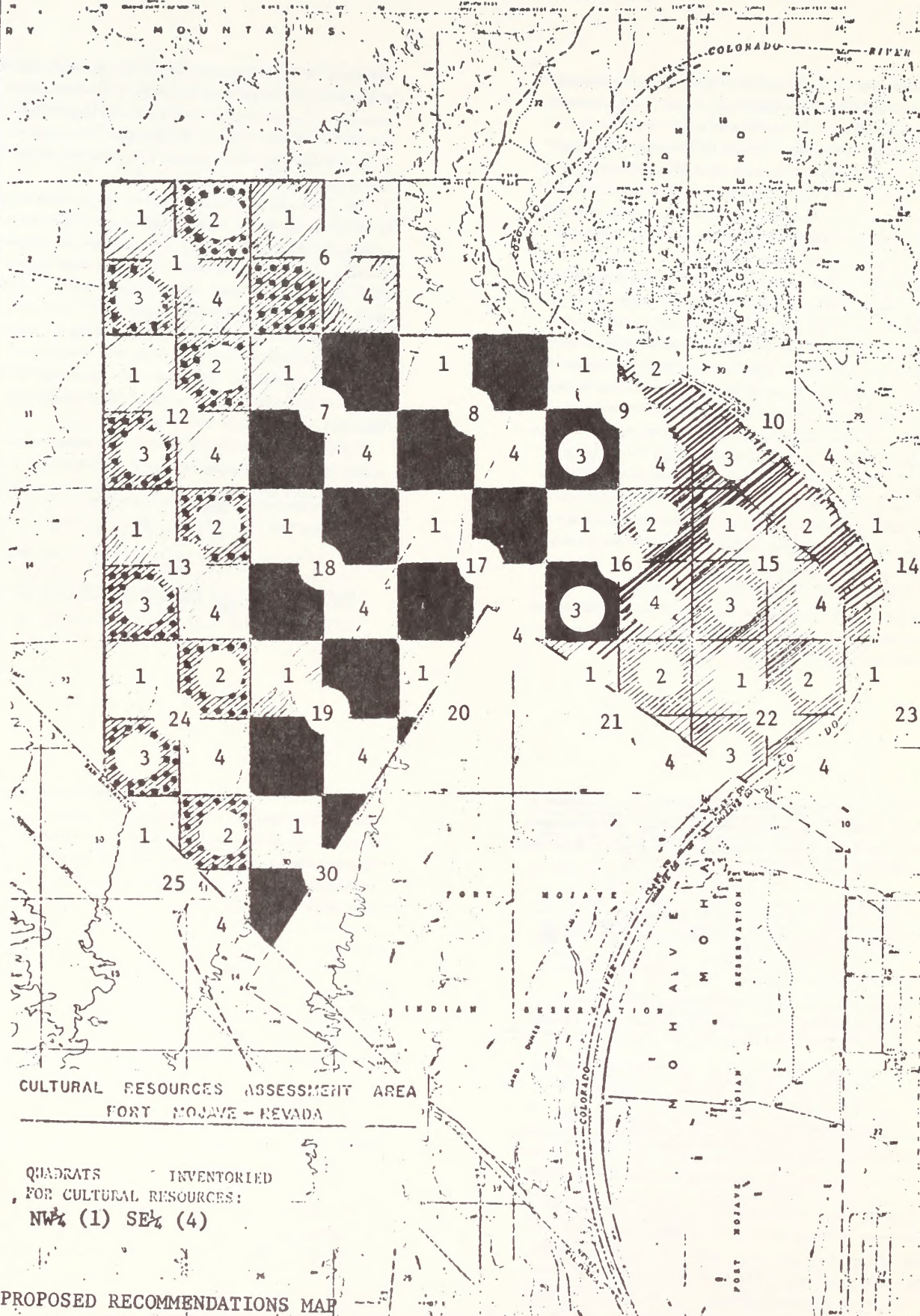
Flood Plain 10-4, 15-1 and 4, 16-4, 13-1 and 4, 24-1 and 4, 22-1 and 4 and part of 9-4.

Alluvial Fan 1-1 and 4, 12-1 and 4, 13-1 and 4, 24-1 and 4, 25-1 and 4, 6-1 and 4, 7-1 and 19-1.

Archaeological clearance is recommended for the following unsurveyed units which are coded ☒ on the Proposed Recommendations Map.

Flood Plain 9-2, 10-3, 15-2 and 3, 16-2, 21-2, 22-2 and 3.

recorded in the Fort Mojave survey area. No apparent National Register sites (CRES, S-1) were encountered during this survey meeting the criteria of 36CFR800.10. The sites rated as S-2 are considered to have a potential for contributing data to aid in the determination of possible prehistoric task-specific sites and habitation patterns in this southern Great Basin region of the Colorado River valley.



BY NAME, ADDRESS, CITY, STATE, ZIP

DATE: 10/1/78

BY: [Signature]

FOR: [Signature]

RE: [Signature]

APPROVED: [Signature]

DATE: 10/1/78

BY: [Signature]

FOR: [Signature]

RE: [Signature]

APPROVED: [Signature]

DATE: 10/1/78

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Project: BLM - Fort Mohave Collector: NAS Field Crew Date Collected: July 26, 27, 28, 1976 Type Collection: Survey					Cataloger: Olson Date: 8/24/76 Page: 1	
Site No.	Catalog No.	Quantity	Description - Material	Level	Remarks	
FM-35	5-503-1	1	mule or donkey shoe	surface		
FM-1	5-504-1	2	sherds, plainware	"		
FM-2	5-505-1	1	sherd, plainware	"		
FM-32	5-506-1	4	waste flakes, quartzite & fossil	"		
	5-506-2	1	river cobble, flaked along one edge	"		
FM-15	5-507-1	3	waste flakes, chert & chalcedony	"		
FM-36	5-509-1	1	large waste flake-secondary, volcanic	"		
FM-31	5-510-1	10	waste flakes, quartzite, volcanic, and chert	"		
	5-510-2	1	river cobble, unifacially flaked along one edge, quartzite	"		
	5-510-3	1	sherd, plainware	"		
	5-510-4	3	rimshards, plainware	"		
FM-16	5-512-1	1	waste flake, quartzite	"		
	5-512-2	1	core, globular, quartzite	"		
	5-512-3	6	sherds, plainware	"		
FM-18	5-513-1	1	waste flake, chalcedony	"		
	5-513-2	1	waste flake, quartzite	"		

Project: BLM - Fort Mohave Collector: NAS Field Crew Date Collected: July 26, 27, 28, 1976 Type Collection: Survey					Cataloger: Olson Date: 8/24/76 Page: 2	
Site No.	Catalog No.	Quantity	Description - Material	Level	Remarks	
FM-37	5-514-1	2	river cobbles randomly flaked, quartzite	surface		
	5-514-2	1	large river cobble flake, bifacially flaked to form chopping edge, quartzite	"		
FM-20	5-515-1	1	large waste flake	"		
	5-515-2	1	flake scraper, unifacially worked, minimal utilization, chalcedony	"		
FM-17	5-516-1	1	river cobble, unifacially flake, battered along one edge, quartzite	"		
FM-3	5-517-1	1	possible core fragment, quartz	"		
	5-517-2	1	sherd, plainware	"		
FM-5	5-518-1	2	waste flakes, chert & volcanic	"		
	5-518-2	1	hammerstone fragment, battered along edge, some flakes removed. volcanic	"		
	5-518-3	2	sherds, plainware	"		
	5-518-4	11	sherds, stuccoware	"		
FM-38	5-519-1	1	primary flake, possible secondarily flaked no utilization, chert	"		

Project: BLM - Fort Mohave
Collector: NAS Field Crew
Date Collected: July 26, 27, 28, 1976
Type Collection: Survey

Cataloger: Olsen
Date: 8/24/76
Page: 3

Site No.	Catalog No.	Quantity	Description - Material	Level	Remarks
PM-38	5-519-2	1	cobble randomly flake, one edge formed, possibly battered along unworked edge	surface	
	5-519-3	1	sherd, historic ceramic, possibly worked along one edge	"	
PM-6	5-520-1	1	core on a river cobble, battered along one edge	"	
	5-520-2	1	sherd, plainware	"	
PM-23	5-522-1	1	waste flake - chalcedony	"	
	5-522-2	5	sherds, plainware	"	
PM-8	5-523-1	1	river cobble, possibly battered	"	

Project: BLM - Fort Mohave
Collector: NAS Field Crew
Date Collected: July 26, 27, 28, 1976
Type Collection: Survey

Cataloger: Olsen
Date: 8/24/76
Page: 2

Site No.	Catalog No.	Quantity	Description-Material	Level	Remarks
26 CK 1406	5-508-1	4	waste flakes, chert & quartzite	surface	
26 CK 1403	5-511-1	1	sherd, historic ceramic with trade mark	"	
26 CK 1412	5-521-1	2	waste flakes, quartzite & chalcedony	"	
	5-521-2	1	shell cartridge, W.R.A. Co., 44 W.S.F.	"	
26 CK 1417	5-524-1	27	sherds, plainware	"	

APPENDIX E

NATIONAL RESOURCES DEFENSE COUNCIL

LETTER OF 3/13/75

Natural Resources Defense Council, Inc.

664 HAMILTON AVENUE
PALO ALTO, CALIF. 94301
415 347-1080

Washington Office
817 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

March 13, 1975

New York Office
15 WEST 47TH STREET
NEW YORK, N.Y. 10036
212 869-0150

The Honorable Rogers C. B. Morton
Secretary of the Interior of the United States
United States Department of the Interior
Washington, D.C. 20240

Re: Final Environmental Statement for the Sale
of Fort Mohave Lands to the State of Nevada

Dear Secretary Morton:

We believe that the proposed transfer of Public Lands described in the above-referenced final environmental impact statement (hereinafter "EIS") will, if implemented, violate Section 7 of the Endangered Species Act of 1973, 16 U.S.C. § 1536. In addition, we believe that the EIS fails to comply with the requirements of the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 et seq. Consequently, we urge that the lands in question be retained in public ownership, and that the EIS be rejected by you. In what follows, we discuss these points in detail.

The Public Lands which are the subject of the proposed transfer total 9,000 acres and are located along the Colorado River at the southern tip of Nevada. These lands, known as the Fort Mohave Lands, are currently undeveloped and provide habitat -- food, water, and cover -- for nine endangered terrestrial species: the Desert Tortoise, the Spotted Bat, the Gila Monster, the Yuma Clapper Rail, the Brown Pelican, the Bald Eagle, the Prairie Falcon, and the Peregrine Falcon. (EIS at 100.) Additionally, four endangered fish species -- the Woundfin, the Colorado River Squawfish, the Humpback Sucker, and the Longtail Chub -- inhabit the Colorado River, adjacent to these lands. (EIS at 77a.)

If implemented, the transfer will result in intensive development of the Fort Mohave Lands, primarily for residential and resort purposes. As a result, the transfer will unquestionably have an adverse impact on the terrestrial species enumerated above (EIS at 77a, 100), and may also have an adverse impact on the habitat of the fish listed above. (EIS at 77.) Therefore, your approval of the transfer is, we submit, prohibited by Section 7 of the Endangered Species Act.

Section 7 of the Act requires you, or an agent selected by you, to determine first whether or not the area involved is in fact "critical." No such federal action may proceed in the absence of written certification, based on adequate evidence, that no "critical" habitat is involved. Accordingly, in this instance, approval of the transfer of the Fort Mohave Lands to the State of Nevada must be accompanied by such certification.

The EIS, however, fails to contain the type of information on which the required certification could be based. Although it concludes that the Fort Mohave Lands are not critical habitat areas for the endangered terrestrial species which inhabit them (EIS at 77a), this conclusion is wholly unsupported by any quantitative data, references, or other documentation.

Even assuming that evidence existed to justify certification that these lands are not "critical" habitat, the proposed transfer would still have to meet the second test imposed by Section 7. As noted above, that section directs all agencies to "[take] such action necessary to insure that actions . . . carried out by them do not jeopardize the continued existence" of protected species.

While the EIS states that the transfer, if implemented, "could enhance" the habitat of endangered fish in the Colorado River (EIS at 77a), it admits that implementation will undoubtedly adversely impact all of the endangered terrestrial species in the area. (EIS at 100.) It further concedes that these adverse impacts "could not be mitigated." (EIS at 101.) Consequently, we believe that the proposed transfer must be rejected in order to "insure that the continued existence" of these species is not "jeopardize[d]."

Finally, Section 7 of the Act imposes a requirement that federal agencies consult with, and obtain the assistance of, the Secretary in order to ensure that proposed actions do not result in prohibited effects. It is our understanding that you have delegated your responsibility in this respect to the U.S. Fish and Wildlife Service. The relationship of the consultation requirement to the purposes of the Act is obvious, and its importance can hardly be underestimated. It is designed to ensure that adequate information with respect to protected species and their needs is obtained from experts, that the extent of the danger to such species is determined, and that the methods, if any, by which the danger may be avoided, are fully and thoroughly explored. This requirement is the means by which the information needed to determine the legality of federal actions is developed.

At least insofar as can be determined from the EIS, the BLM has not fulfilled this requirement. In the first place, although the statement indicates that the U.S. Fish and Wildlife Service in Phoenix, Arizona was "contacted" in connection with the Act as it "pertains" to the Fort Mohave EIS (EIS at 124) and that comments were received (EIS at 124B), the comments are not reproduced, and the analysis of comments on the draft statement (EIS at 128 et seq.)

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I. THE APPLICABILITY OF THE ENDANGERED
SPECIES ACT TO THE PROPOSED TRANSFER

In passing the Endangered Species Act, Congress intended to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." (§ 2(b)), in order to maximize the "esthetic, ecological, historical, recreational, and scientific value [of all such species] to the Nation and its people. . . ." § 2(a)(3). In furtherance of these aims, Congress declared its "policy" to be that "all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities" to do so. § 2(c). Moreover, to enforce this policy, Congress in Section 7 of the Act placed a heavy and non-discretionary burden on all federal agencies and charged you, as Secretary of the Interior, with the duty of ensuring that those agencies fulfilled their responsibility:

"The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act and by taking such action necessary to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical."

The breadth of the restrictions on federal actions contained in Section 7 is indicative of a Congressional intent to hold federal agencies to the highest possible standard of conduct with respect to endangered species. By its clear language, Section 7 imposes two independent tests for determining the legality of federal actions which potentially affect such species. It prohibits actions which "jeopardize the continued existence" of protected species and those which "result in the destruction or modification" of habitat areas which you, as Secretary, have determined to be "critical." If a proposed action will have either of these adverse impacts, it may not be undertaken.

In any case in which a proposed federal action will potentially affect the habitat of one or more protected species, we submit that

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makes no reference to them.^{1/} Surely mere "contact" is not the equivalent of "consultation."

In the second place, the types of information the requirement was designed to produce are clearly not included in the final statement. For example, the statement contains no quantitative evidence concerning any protected species. It contains no figures on their current numbers and, despite the fact that the transfer will admittedly "result in a net reduction in numbers" of "some species" (EIS at 124), the extent of that reduction is not even estimated.

Instead of presenting quantitative and detailed information about protected species, this statement presents undocumented generalizations. It asserts, for example, that the impact on some species will be "minimal," while it concedes that the "total impact" on others is "unknown." (EIS at 77a.) It repeatedly asserts that resident terrestrial species will be "displaced" to other areas if the transfer is implemented (EIS at 77-77a), thereby implying that they will "adjust" to their new surroundings, despite the fact that it is probable that a high mortality rate will result from the stress. See, e.g., Comments on the draft EIS submitted by the Department of the Army, South Pacific Division, Corps of Engineers, reproduced at p. 171 of the EIS. Moreover, while the statement asserts that the habitat of endangered fish species could be enhanced by the increased temperature of the Colorado River which will result from implementation of the transfer and development of these lands, it admits that "little is known about the effect" the petroleum pollution, which will result from construction of the proposed marina, will have on endangered and other fish species, as well as on waterfowl and shore birds. (EIS at 77-77a.)

There is, therefore, no way in which this EIS in its present form can be used to justify the proposed transfer of these lands in light of the stringent requirements of the Endangered Species Act. At the very least, if you do not refuse to implement the transfer, you must withhold your approval until after adequate information concerning endangered fish and wildlife is obtained, included in the EIS, and considered. Such information must detail the nature and extent of the damage which approval will inflict on these species, as well as the means, if any, by which such damage

^{1/} Only one letter from any employee of the Service is included, and that letter specifically states "[t]his evaluation is of local origin and does not necessarily reflect the views of our Regional Director . . ." Letter from Thomas J. Harper, U.S. Game Management Agent, Fish and Wildlife Service, Las Vegas, Nevada, dated February 27, 1973, reproduced in EIS at p. 159.

may be minimized, 2/

II. THE APPLICABILITY OF THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 ("NEPA")

This final impact statement clearly fails to meet the requirements of NEPA. Its most significant defect stems from its failure to acknowledge, except in the most cursory manner, the relevance and applicability of the Endangered Species Act to the proposed transfer. Compliance with Section 102(2)(C)(iii) of NEPA requires a thorough analysis of reasonable, contemporaneous alternatives to proposed actions. See, e.g., NRDC v. Morton, 458 F.2d 827, 837 (D.C. Cir. 1972).

Although this statement does discuss a number of alternatives, including that of "no action" (EIS at 119), it does not discuss the alternatives of retaining and managing these Public Lands solely to conserve and increase the endangered species which inhabit them. Given the purposes and policy of the Endangered Species Act, the failure to discuss this alternative is obviously a "glaring deficiency," EDF v. Corps of Engineers (Gilham Dam), 325 F. Supp. 728, 761 (E.D. Ark. 1970-71), and one which renders the statement inadequate.

This final statement also violates other important, non-discretionary requirements of NEPA. NEPA is a full disclosure law, EDF v. Corps of Engineers, supra at 759, and compliance with Section 102(2)(C) requires that all environmental impacts of a proposed action be discussed fully and in detail. Insufficiently detailed and overly conclusory statements patently fail to fulfill its requirements and goals. See, e.g., Calvert Cliffs' Coordinating Comm. v. AEC, 449 F.2d 1109 (D.C. Cir. 1971); NRDC v. Morton, supra at 833. Comments on the proposed action must be included. EDF v. Corps of Engineers, supra at 759.

As shown above, the statement's discussion of the impact of this transfer on endangered species is conclusory and lacking in detail. The comments of the U.S. Fish and Wildlife Service and others are omitted. In short, it contains none of the information

2/ In this connection, we commend to your attention the position of the U.S. Fish and Wildlife Service with respect to the Army Corps of Engineers' Meramec Park Reservoir project in Missouri. Despite the fact that federal funds had been appropriated and expended, and construction on the project begun, the Assistant Secretary of the Interior, Nathaniel P. Reed, requested the Corps to declare a moratorium on construction-oriented activities until adequate information regarding the endangered Indiana bat could be obtained. See letter of October 8, 1974, from Assistant Secretary Reed to W.C. Gribble, Jr., Lieutenant General, U.S.A., Chief of Engineers, Department of the Army.

protect the endangered fish and wildlife, preserve this valuable, riparian open space, and avoid the numerous other significant environmental problems, such as those related to air and water quality, which the EIS acknowledges will result from implementation of the transfer. See, e.g., EIS Summary (unpaged) and p. 100.

In conclusion, we again urge you to retain the Fort Mohave Lands in public ownership, and to refuse to approve their transfer to the State of Nevada.

In the event that you decide to approve the proposed transfer, please be advised that we intend this letter to serve as notification of your violation of the Endangered Species Act, pursuant to Section 11(g)(2)(A)(i) of that Act, as of the date of your approval.

Very truly yours, .

Roger Beers

Roger Beers

Johanna H. Wald

Johanna H. Wald

RB:JHW:gg

cc: Nathaniel P. Reed
Assistant Secretary of the Interior

Curtis J. Berklund, Director
U.S. Bureau of Land Management

E. I. Rowland
Nevada State Director
U.S. Bureau of Land Management

required to produce "the most intelligent, optimally beneficial decision." Calvert Cliffs, supra at 1114.

The proposed transfer of the Fort Mohave Lands is clearly a holdover from the days when public domain lands were regarded as temporary possessions of the federal government, whose eventual disposal was regarded as a matter of course. 3/ Public attitudes toward these lands have changed markedly since those days. It is now widely agreed that they should be retained in public ownership, except when the national interest requires otherwise. This attitude is expressed, for example, in all versions of the proposed "Organic Act" for the BLM.

The "national interest" does not require the transfer of the Fort Mohave Lands. On the contrary, that interest, as expressed in NEPA and the Endangered Species Act, can only be served by their retention in federal ownership, since only retention will

3/ Indeed, there appears to be a substantial question as to the legality of the proposed transfer. In 1960, Congress authorized the conveyance of approximately 15,000 acres of Public Lands to the Colorado River Commission acting for the State of Nevada. P.L. 86-433, 74 Stat. 74. It granted the Commission, acting on behalf of the State, a five-year "option . . . of having patented to the State by the Secretary all of the lands within the transfer area." Id. § 3 (emphasis supplied). In 1963, Section 3 was amended and a ten-year option period was established. P.L. 88-15, 77 Stat. 14. The "purpose" of the amendment, according to both the House and Senate Reports which accompanied it, was "to extend for 10 years (i.e. until April 22, 1970) the time within which the State may complete the purchase" of the entire 15,000-acre area. H.R. Rep. No. 92, 88th Cong., 1st Sess. 1 (1963); S. Rep. No. 120, 88th Cong., 1st Sess. 1 (1963) (emphasis supplied). To date, only about 6,000 acres of the total area have actually been transferred to the State. The Fort Mohave Lands which are the subject of the proposed transfer constitute the remainder. According to the EIS, they "remain to be purchased by the State..." (EIS at 2) Clearly, neither the terms nor the purpose of the amended Act have been met.

The EIS makes no reference to the terms or purpose of the amended Act. It appears to find authority for the transfer in an agreement, dated March 28, 1972, between the Secretary of the Interior and the Colorado River Commission. (EIS at 11.) This agreement is referred to as an "Amendment to Contract of Sale between the U.S. and the State of Nevada." (EIS at 5.) Since this "amendment" was plainly entered into after expiration of the 10-year period, and prior to completion of the purchase, reference to it does not solve the question as to the ultimate authority of the Secretary to convey these lands.

APPENDIX F

ENVIRONMENTAL DEFENSE FUND

LETTERS OF 9/16/74 AND 3/5/75

**ENVIRONMENTAL
DEFENSE
FUND**



2728 DURANT AVENUE, BERKELEY, CALIFORNIA 94704/415 548-8906

September 16, 1974

E. I. Rowland
State Director
Bureau of Land Management
Nevada State Office Building
Room 3008 Federal Building
33 Booth Street
Reno, Nevada 89502

Dear Mr. Rowland:

Thank you for your letter of August 26, 1974 concerning the proposed transfer of land in the Fort Mohave area.

We are pleased to hear that the final environmental impact statement will be available for public review this month and request that you send us a copy.

We were surprised to learn that the proposed transfer is being studied without consultation with the Advisory Council on Historic Preservation and without a survey of the cultural resources in the area. These disclosures were especially disturbing in view of the statements in the draft environmental impact statement noting the existence of numerous petroglyphs, pictographs, intaglios and other archeological phenomena in the area. We urge you complete proper surveys of these resources in consultation with the Advisory Council before the proposed transfer is considered. The legal bases for our request is as follows:

The Congressional policy in favor of preserving and protecting our nation's historical and archeological resources is set forth in several different statutes. The Historic Sites Act of 1935, 49 Stat. 666 (16 U.S.C. 461 et seq.) declares that "... it is national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the United States." (16 U.S.C. 461). The Act further provides that it is the duty of the Secretary of Interior to "preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance . . ." (16 U.S.C. 462(f)). The

Mr. E. I. Rowland
September 16, 1974
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Antiquities Act of 1906, 34 Stat. 225 (16 U.S.C. 431 et seq) provides that the Secretary of the Interior may issue permits "for the examination of ruins, the excavation of archeological sites, and the gathering of objects of antiquity upon the lands under" his jurisdiction provided that such "examination, excavations, and gatherings are undertaken for the benefit of reputable museums, universities, colleges, or other recognized scientific or educational institutions. . ." (16 U.S.C. 432). The National Historic Preservation Act of 1966, 80 Stat. 915 (16 U.S.C. 470) (hereinafter "NHPA") declares:

- (a) that the spirit and direction of the Nation are founded upon and reflected in its historic past;
- (b) that the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;
- (c) that, in the face of ever-increasing extensions of urban centers, highways, and residential, commercial, and industrial developments, the present governmental and non-governmental historic preservation programs and activities are inadequate to insure future generations a genuine opportunity to appreciate and enjoy the rich heritage of our Nation. . .

Section 106 of NHPA implements these policies by directing that:

The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the

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Mr. E. I. Rowland
September 16, 1974
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undertaking of prior to the issuance of any license, as the case may be, taken into account the effect of the undertaking on any district, site, building, structure, or object that is included in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.

This obligation to report to the Council on sites listed in the National Register was amplified and expanded by President Nixon in Executive Order 11593 issued on May 13, 1971 (36 Fed.Reg. 8921). Section 2 of this Order required that federal agencies "locate, inventory, and nominate" sites under their jurisdiction which would qualify for listing in the National Register and that until this was completed the agency is directed to "exercise caution . . . to insure that any federally owned property that might qualify for nomination is not inadvertently transferred . . ."

To implement these and other laws the Advisory Council on Historic Preservation issued implementing regulations on January 25, 1974 (39 Fed.Reg. 3366). These regulations provide the procedures which must be followed to comply with Section 106 of NHPA and Executive Order 11593. A copy of the regulations is enclosed herewith. (See also Section 6231 of the BLM Manual). There is little doubt that up to now you have proceeded in violation of these procedures and thus have placed into jeopardy the legal enforceability of the proposed transfer. For that reason we urge you to consult with the Advisory Council immediately so that the proper safeguards are taken to protect the archeological resources of this area.

Very truly yours,

Richard E. Cutting, Jr.
Richard E. Cutting, Jr.
Regional Counsel

cc: National Advisory Council on
Historic Preservation
Tom Layton, Director, Nevada State
Museum
Charles Watson, Jr., Director, National
Public Lands Task Force

**ENVIRONMENTAL
DEFENSE
FUND**

2728 DURANT AVENUE, BERKELEY, CALIFORNIA 94704/415 548-8906

March 5, 1975

E. I. Rowland
State Director
Bureau of Land Management
Nevada State Office Building
Room 3008 Federal Building
33 Booth Street
Reno, Nevada 89502

Re: Ft. Mohave Land Transfer

Dear Mr. Rowland:

Thank you for sending a copy of the final Environmental Impact Statement for the proposed sale of Ft. Mohave Lands which we received in early February.

We were interested to learn on page 30 that summer convective storms might produce overland flood flows "of considerable magnitude" on the Ft. Mohave development area; that the Big Bend watershed has a "high potential" for producing large flood flows; and that the U.S. Soil Conservation Service assessed the hydrological characteristics of the terrain as indicating "a rather high runoff potential."

EDF notes that under Executive Order #11296 there is a clearly expressed policy against federal support of projects which will increase the risks of flood hazard to persons and property:

Section 1. The heads of the executive agencies shall provide leadership in encouraging a broad and unified effort to prevent uneconomic uses and development of the Nation's flood plains and, in particular, to lessen the risk of flood losses in connection with Federal lands and installations and federally financed or supported improvements.

31 Federal Register No. 155, 8-11-66.

Specifically, the proposed transfer of Ft. Mohave Lands by the Bureau of Land Management is an action which under the order requires an evaluation of flood hazards, the attachment of use restrictions upon the conveyance of the land, and possible withholding of the lands from disposal. Executive Order 11296 provides:

(3) All executive agencies responsible for the disposal of Federal lands or properties shall evaluate flood hazards in connection with lands or properties proposed for disposal to non-Federal public instrumentalities or private interests and, as may be desirable in order to minimize future Federal expenditures for flood protection and flood disaster relief and as far as practicable, shall attack appropriate restrictions with respect to uses of the lands or properties by the purchaser and his successors and may withhold such lands or properties from disposal. (emphasis supplied)

31 Federal Register No. 155,
8-11-66

Furthermore, EDF notes that the existence of a flood plain of a one in 100 year storm would necessitate the involvement of any new Ft. Mohave community in the National Flood Insurance Program by July 1, 1975, under the Flood Disaster Protection Act of 1973, which mandates community participation in the program to qualify for federally-backed financing, including mortgages and loans from the Small Business Administration, the Veterans Administration, the Federal Housing Administration, as well as all federally backed banks and lending institutions (virtually all such institutions).

Inasmuch as the Final EIS prepared by the BLM does not adequately evaluate the risks of flooding attendant upon development of the Ft. Mohave land, EDF strongly urges that the BLM comply with stated executive policy by:

(1) making an evaluation of flood hazards in the Ft. Mohave area, which assessment should ascertain:

- a. the existence and extent of a flood plain of a one in 100 year storm;
- b. the danger potential of washes flowing into the Colorado River;
- c. the impact of the proposed marinas under the Stewart-Eisner and Beaumont development alternatives upon the flood hazard potential.

Such an evaluation might logically rely upon use of materials on file at the Los Angeles District of the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation which built the levees on the Colorado River, the U.S. Soil Conservation Service, or the U.S. Geological Survey, as well as independent field investigation by any of these agencies.

Mr. Rowland
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(2) including in any conveyance adequate use restrictions and building requirements to safeguard any proposed construction against the risk of flood damage and to protect lives threatened by such floods as caused the Nelson dry-wash disaster of the summer of 1974;

(3) notifying the proposed transferee, the Division of Colorado River Resources, and its successors, and all potential developers of the land, of the magnitude of flood risks attendant upon development of the site;

(4) withholding the land from transfer until it is clear that development of the Ft. Mohave land would be economically, environmentally and esthetically sound.

We seriously question the wisdom of disposing of one of three extant lower Sonoran Colorado River life zones, the sole habitat of the endangered species the Yuma Clapper Rail, for the purpose of exposing persons and property to flood risks.

Cordially yours,

Gerald H. Meral
Gerald H. Meral, Ph.D.
Staff Scientist

James J. Adams
James J. Adams
Law Intern

cc: J. Robert Hunter, Jr., Federal Insurance Administration
Division of Colorado River Resources
Rogers C.B. Morton, Secretary of Interior
Morley W. Griswold, Reno Insuring Office, HUD
Charles Watson, Nevada Outdoor Recreation Association
Sierra Club Legal Defense Fund
Natural Resources Defense Council
Colonel Foley, U.S. Army Corps of Engineers
Curt Berkland, Director, Bureau of Land Management

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Mr. Rowland
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